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National Ambient Volatile Organic Compounds (VOCs) Data Base Update, Documentation

Nero and Associates, Inc., Portland, OR

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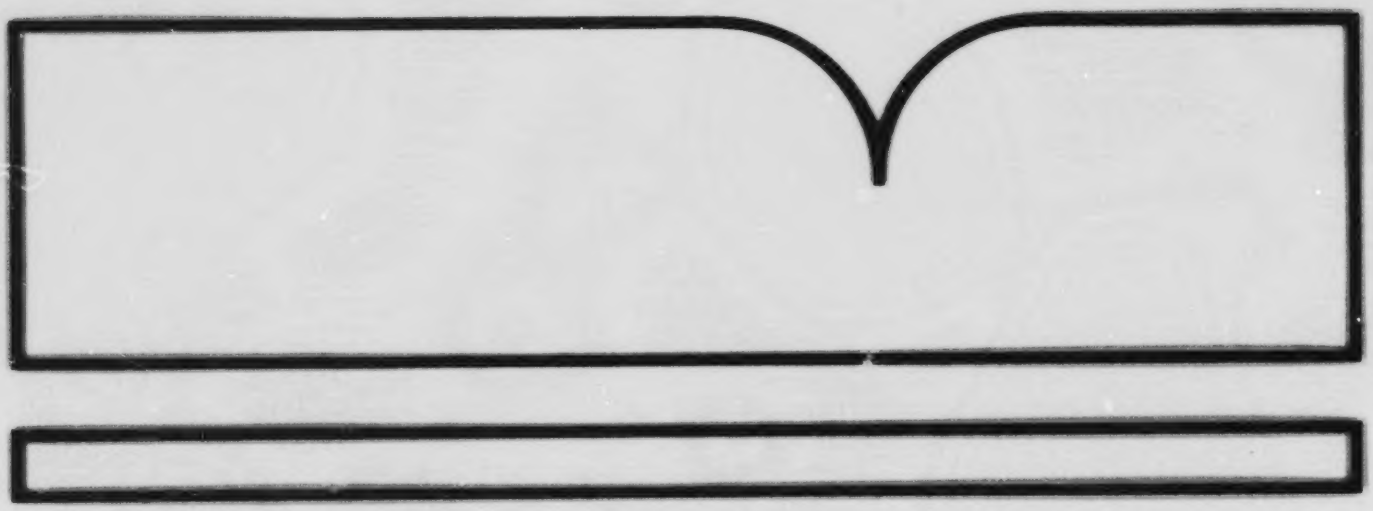

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16. ABSTRACT

Data on the observed concentrations of three hundred twenty (320) volatile organic compounds (VOCs) were compiled, critically evaluated, and assembled into a relational data base. Ambient (i.e., outdoor) measurements, indoor data, and data collected with personal monitors are included. The data are primarily from the period 1970-1987 and for locations within the United States. In order to compare data from many different sources, each concentration record in the data base represents the daily average for a single chemical, wherever feasible. The total data base contains more than 175,000 concentration records.

Summaries of the data distributions are tabulated in the report. Averages, medians and quartile values are given for each chemical measured in both the ambient and indoor site categories. Median values are also listed for each chemical for the eight specific site types included in the data report. The ambient site types are: remote, rural, suburban, urban, and source dominated. The indoor category of site types include residential indoor, workplace (non-industrial), and personal monitors.

The data have been assembled into a relational data base using dBASE III Plus, a commercially available data base management program. The report contains a complete description of the data base files and a guide describing the use of a prepared program for searching and maintaining the data base.

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NATIONAL AMBIENT VOLATILE ORGANIC COMPOUNDS (VOCs) DATA BASE UPDATE

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DISCLAIMER

The information in this document has been funded wholly or in part by the United States Environmental Protection Agency under Contract No. 68-02-4190 to Nero and Associates, Inc., Portland, Oregon. It has been subjected to the Agency's peer and administrative review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

PREFACE

This document is an update of "Volatile Organic Compounds (VOCs) in the Atmosphere: An Assessment of Available Data", by Brodzinsky and Singh, EPA 600/3-83-027(a) and is the result of an ongoing effort to gather, evaluate and compile ambient concentrations of more than 300 VOCs into microcomputer readable format to allow wide distribution and easy access. All the information from the original data base (covering the years 1970 to 1980) have been included in this update. The reader is encouraged to consult the original document for information on VOCs concentrations prior to 1980.

While this data base has many applications, users must recognize that it also has many potential abuses. Researchers collect and measure VOCs for a wide variety of purposes. A summary of these purposes is provided in the data base for many studies but the original references should be consulted for more detailed information. In addition, all available data were included and were given a quality rating. It is ultimately the data base user's responsibility to assess the applicability of the data base for specific uses.

Because this is an ongoing effort, users are encouraged to send data not included here for inclusion in future updates to Dr. Larry Cupitt, U.S. Environmental Protection Agency, ASRL, Mail Drop 84, Research Triangle Park, NC 27711. The support and cooperation of interested users are essential to the continued vitality of the data base.

This data base can be obtained from (Dr. Jitendra Shah, President, G_2 Environmental, Inc., 304 S.W. Hamilton Street, Portland, Oregon 97201 (503) 228-2335) one of the authors of this report; or the National Technical Information Service (NTIS).

ACKNOWLEDGEMENTS

The researchers and agencies who so generously contributed their time and VOCs data to this project have our gratitude. Without their efforts there would be nothing to report. We also thank in advance these and other researchers for future contributions.

It is our pleasure to thank the Project Officer, Dr. Larry Cupitt of U.S. EPA/ASRL, for initiating this update and for gathering the majority of the data from EPA-funded sources. Without his technical assistance and unfailing cheerfulness, this study would not have been completed.

Many other people had a hand in preparing this report. Drs. Hanwant Singh and Richard Brodzinsky, the authors of the original report, provided invaluable guidance and technical support. Their intimate knowledge of the VOC measurement process contributed significantly to the rating and ranking of the data.

Drs. M.A.K. Khalil, Rei Rassmussen, of the Oregon Graduate Center; Robert Lewis, Hal Richter, of EPA; and John Watson of the Desert Research Institute were on the advisory panel and have provided critical technical review throughout the project.

Drs. John Mackey of Occidental Chemical, and Lance Wallace and William Hunt of U.S. EPA provided critical comments regarding rating and ranking methodology and this report.

Members of Nero and Associates, Inc. staff who made significant contributions include Laurie Sawtell, Ann Batson, Robyn Johnson, Bridget Gordon, Gail Bramer, Amy Osborne, Arthur Nelson and Jennifer Kerr. Mark Heyerdahl co-authored the VOC utility programs and assisted with statistical analysis and data management.

J.J.S.
E.K.H.

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I. INTRODUCTION

A. Background

Anticipation of new federal regulations for air toxics has placed added emphasis on the measurement of Volatile Organic Compounds (VOCs) in most states. Consequently, knowledge concerning ambient atmospheric concentrations of VOCs has advanced considerably in the last decade.

A national ambient VOCs data base was prepared for the United States Environmental Protection Agency (EPA) by collecting, evaluating and consolidating reports of ambient concentrations of VOCs in the United States for the years 1970 to 1980 (Brodzinsky and Singh, 1983). The EPA report was well received and has proven to be a useful document to many researchers.

In this study, the 1980 data base has been updated to include ambient and indoor VOCs concentrations in urban, rural, remote, source-dominated and indoor environments for the years 1980 to 1987. It covers more than 300 potentially hazardous VOCs. The updated data base is available on microcomputer (IBM PC-compatible) diskettes for use with dBASE III+, a relational data base management system.

This data base has many potential uses (Shah et al., 1987a and b; Shah 1988 a, b and c; Shah and Heyerdahl 1988). It can allow preliminary comparison of air quality in urban, non-urban, source-dominated and indoor environments. It can highlight areas of adequate and inadequate information, allowing more efficient allocation of resources. It can also provide a foundation for evaluating the implications of state and federal regulations and litigations with industry.

B. Objectives

Objectives of the data base update were to:

- Review the 1980 VOCs data base and correct any discrepancies found;
- Identify new published and unpublished VOCs data, critically evaluate it, combine it with the previous data and summarize the resulting data base; and
- Provide the resulting data base in a microcomputer dBASE III+ format designed to facilitate searching, sorting, editing, analysis and other manipulations.

C. The 1980 VOCs Data Base

The existing VOCs data base, "Volatile Organic Chemicals in the Atmosphere: An Assessment of Available Data," EPA 600/3-83-027(a), was published in 1983. It contained data collected from 1970 to 1980 and was created under a previous EPA contract in which 241 articles were evaluated. Of these, 67 yielded 17,700 records of information on 132 chemicals; each record represented all the reported measurements for one chemical at one site during one day.

In addition, each data record includes maximum and minimum concentrations; the total number of measurements included in the average and the number of those which were below the detection limit or equal to zero; sampling and analysis methods; sample start and stop times; time elapsed between sampling and analysis; detection limit; and a quality rating. These data have also been included in the 1987 data base.

All data were evaluated for their usefulness in concentration trend analysis. It was found that for any specific chemical, too little data were available to make accurate health assessments or trend analyses. The data also were discovered to be limited primarily to the warmer months and daylight hours, as well as to a few geographical regions.

NOTE: In this report, the original VOCs data base will be referred to as the 1980 data base, while the update will be referred to as the 1987 VOCs data base. The 1987 data base includes all of the 1980 data base.

II. TECHNICAL APPROACH

This section describes the work elements required to achieve each of the objectives identified in Section I as well as details of data base file structures and contents.

A. Review of the 1980 Data Base

The 1987 data base subsumed the 17,700 records of the 1980 data base (Brodzinsky and Singh, 1983). The reformatting and review of the 1980 data base are discussed in the following two sections.

1. Reformatting and Modification of the 1980 Data Base

The 1980 data base, which consisted of 151 ASCII files, each containing all the information on one chemical, was combined into six dBase III+ files. The relational nature of dBase III+ permits the linking of these files on key fields such as reference, site, and chemical identification numbers which allows the elimination of much duplication of data. For example, the information identifying a specific site occupies one record in the VOC_SITE.DBF file rather than several original fields of every record for each sample which was taken at that site in the ASCII files. This represents considerable conservation of computer storage when dealing with large data bases.

Two other major changes were made to the 1980 data base. The concentrations were converted from parts per trillion volume (pptv) to parts per billion volume (ppbv). The chemical identification numbers were re-assigned as detailed in Section II.B.3 and the old and new chemical identification numbers are listed in Appendix A. The conversion factors for converting the data into parts per billion Carbon (ppbC) or ug/m^3 are included in a chemical information file discussed in Section II.B.4.

2. Brief Description of dBase III+ Files

Each of the dBase III+ files created for the 1987 data base are briefly described below. The structures of these files are given in Table II-1 and their contents discussed in detail in Section II.B.4.

VOC_AMBI.DBF - This ambient daily average concentrations file contains supporting information and the data quality evaluation.

VOC__INDO.DBF - This file contains indoor daily average concentrations, supporting information and the data quality evaluation.

VOC_MTHD.DBF - Sampling and analysis methods as well as the minimum quantitation limit are provided in this file.

VOC_SITE.DBF - This file contains information on the sampling sites.

VOC__REFS.DBF - Bibliographic information on the references from which the data were extracted is included in this file.

Table II-1. Structure of the Seven Data Base Files

1. and 2. **VOC_AMBI.DBF and VOC_INDO.DBF**

Field	Field Name	Type	Width	Dec
1	REF_ID	Character	4	
2	SITE_ID	Character	3	
3	CHEM_ID	Character	3	
4	CONC_PPB	Numeric	10	3
5	RSD	Numeric	4	
6	NUM_SMPLS	Numeric	3	
7	SAMP_DUR	Character	4	
8	MAX_CONC	Numeric	10	3
9	MIN_CONC	Numeric	10	3
10	START_DATE	Date	8	
11	START_TIME	Character	4	
12	STOP_DATE	Date	8	
13	STOP_TIME	Character	4	
14	DELAY_HRS	Numeric	4	
15	NUMLESSMQL	Numeric	3	
16	COMMENTS	Character	16	
17	RANKING	Character	4	
18	RATING	Character	1	
** Total **			104	

3. **VOC_MTHD.DBF**

Field	Field Name	Type	Width	Dec
1	REF_ID	Character	4	
2	SITE_ID	Character	3	
3	CHEM_ID	Character	3	
4	SAMP_MTHD	Character	8	
5	ANAL_MTHD	Character	8	
6	MQL	Numeric	10	3
** Total **			37	

4. **VOC_SITE.DBF**

Field	Field Name	Type	Width	Dec
1	REF_ID	Character	4	
2	SITE_ID	Character	3	
3	SITE_TYPE	Character	2	
4	LATITUDE	Numeric	6	3
5	LONGITUDE	Numeric	7	3
6	SITE_ADDR	Character	24	
7	CITY	Character	16	
8	STATE	Character	2	
9	SAROAD_NO	Character	12	
** Total **			77	

Table II-1. Structure of the Seven Data Base Files
(Continued)

5. VOC_REFS.DBF

NOTE: This file has an associated VOC_REFS.DBT file which contains text of the memo field.

Field	Field Name	Type	Width	Dec
1	REF_ID	Character	4	
2	CHEMS_MEAS	Character	125	
3	PRININVEST	Character	20	
4	AUTHORS	Character	100	
5	TITLE	Character	200	
6	CITATION	Character	200	
7	YEAR	Character	4	
8	NUM_RECORD	Numeric	6	
9	OBJECTIVE	Memo	10	
** Total **			670	

6. VOC_CHEM.DBF

Field	Field Name	Type	Width	Dec
1	CHEM_ID	Character	3	
2	CAS_NO	Character	12	
3	CAS_NAME	Character	48	
4	SYNONYMS	Character	128	
5	FORMULA	Character	20	
6	NUMCARBONS	Numeric	2	
7	MOL_WT	Numeric	8	3
8	PPB_2_UGM3	Numeric	6	3
9	VPVAL	Character	14	
10	VPUNITS	Character	4	
11	COMMENTS	Character	32	
** Total **			278	

7. VOC_LOC.DBF

Field	Field Name	Type	Width	Dec
1	CHEM_ID	CHARACTER	3	
2	CAS_NO	CHARACTER	12	
3	CHEM_NAME	CHARACTER	48	
4	RELCHEMID	CHARACTER	30	
** Total **			93	

VOC__CHEM.DBF - Information on each chemical in the data base is included in this file along with factors to convert concentrations from ppbV to ppbC or ug/m^3.

VOC__LOC.DBF - This locator file lists synonyms of and chemicals related to the VOCs included in the data base.

3. Review of 1980 Data Base

Fifteen references were selected at random to be checked for data extraction and input errors. However, the references thus chosen did not yield sufficient data records for an adequate evaluation. Therefore, thirteen additional references (for a total of 20% of the references from which data were extracted) were selected which yielded approximately 1000 data records. Of these, we examined 175 records to ascertain errors, if any. Almost no data entry errors were found. Several instances of minor inconsistencies between stated procedure and actual procedure were discovered, but these were minimal and the integrity of the data base was not called into question. A listing of the specific errors found is provided in Appendix D.

Several other corrections were made to the 1980 data base. New categories were added for analysis methods of aldehydes, pararosaniline (P-ROSE) and chromotropic acid (CTA). When appropriate, and where possible these methods were substituted for wet chemical (WETCHEM) in the 1980 data base. Site information was adjusted for reference 41 to improve consistency. Much of the data from reference 21 was replaced by data from reference 284.

While we did not specifically search for data from before 1980 during the update, we encountered several studies from this time period which were not in the 1980 data base but which yielded useful information and were included in the 1987 data base.

B. Addition of New Data

1. Eligibility of Data for the 1987 Data Base

The data which were eligible for inclusion in the 1987 data base varied slightly from those which were eligible for inclusion in the 1980 data base. We specifically sought data only for the 151 chemicals which were targeted for the 1980 data base; however, when encountered, we extracted data on other VOCs. Therefore, the 1987 data base covers more than 300 chemicals.

We specifically sought data only from 1980 to the present, but again if we encountered eligible data from before 1980, we included them in the update.

We sought data from both the outdoor and indoor environments. However, indoor concentrations are limited to either residential or office spaces, while outdoor data are limited to fenceline and beyond. The outdoor and indoor data are separated into two data bases with same structure. The indoor data base (VOC__INDO.DBF) also contains the outdoor measurements data associated with the indoor measurements reported in references.

We sought new data collected only in the United States. A very limited amount of data from Canadian sites was included in the 1980 data base.

We used daily average concentrations where more than one sample was taken per day.

The vast majority of the data are surface measurements. We did include aircraft samples taken from the troposphere, but not from the stratosphere (10 to 50km).

2. Obtaining New Data

We began our search for data by sending surveys to numerous individuals, most of whom were known to be working with VOCs. Only a dozen or so individuals replied and only half of these provided data. We therefore contacted researchers by telephone. This yielded a substantial amount of data both in the form of published and unpublished reports and journal articles, and in computer readable data. An example of the survey is provided in Appendix B.

The second major data acquisition effort was a computerized literature search using the Chemical Abstracts Service (CAS) data base accessed through the DIALOG Information Retrieval Service.

The search was conducted by key words combined with CAS registry numbers as outlined below.

Dialog Command	Comments
!399	Use CA Search Data Base 399
LIMIT ALL/92000001-199999999	limited to 1980 to present
LIMIT ALL/ENG,NPT	limited to English; no patents
SS AIR?	? denotes any word beginning with "air", e.g. air, airborne
SS ATMOSPHERE?	
SS AMBIENT?	
SS TRACE?	
SS VAPOR?	
SS INDOOR?	
SS ENVIRONMENT?	
SS CONCENTRATION?	
SS AIR/SH	limited to the Air Pollution section heading
SS CS=USA	limited the corporate source (i.e. address of author) to the United States

These keywords were combined into one group using the Boolean "or", which eliminated duplicate references. This group was then combined, using the Boolean "and", with CAS registry numbers for each of the 151 target chemicals. This yielded 3000 references. The titles of these references were reviewed and rejected if they indicated: (1) a study

of emissions or sources; (2) a solely health related study; (3) a laboratory or modeling study; or, (4) an industrial workplace study. Thus, of the original 3000 references, 710 were determined to be potentially eligible for inclusion in the update. As many of these references as possible were located and reviewed.

3. Chemicals Included in the 1987 VOCs Data Base

As indicated above, we actively sought only the 151 chemicals which were targeted for the 1980 data base. However, data about other eligible volatile organic chemicals which were sampled along with these targeted chemicals were also extracted. This increased the number of chemicals to 320. Chemicals which were eligible for inclusion were those: (1) with vapor pressures greater than 10^{-6} Torr at 20 °C; (2) known to exist predominantly in the gas phase, not the particle phase; and, (3) which were not pesticides.

This addition of chemicals to the data base necessitated the reassignment of the chemical identification numbers. It was decided for several reasons to abandon the health hazard categories which were implicit in the chemical identification numbers for the 1980 data base. The health hazards posed by some chemicals are unknown or ambiguous, and the dBASE III+ structure allows convenient regrouping of chemical species by health effects and other researches.

To assign the new chemical identification numbers, the chemicals were ordered by CAS registry number and numbered sequentially. The four chemicals for which we could find no CAS registry number (diphenyl ether, cumene, butyne, and 7-methyl-3-methylene-1, 6-octadiene) were assigned a value in the CAS registry number field of 00-00-1 through 00-00-4. A listing of the chemical identification numbers used in the 1980 data base along with their corresponding identification numbers in the 1987 data base are provided in Appendix A.

Chemicals which were often not resolved, such as the m/p-xylenes, were often reported as a single concentration. However, changes in sampling and analysis methods have sometimes allowed the concentrations of these chemicals to be determined separately. For those species which were reported as unresolved peaks of two chemicals, the data were reported under both chemical identification numbers and a note placed in the comments field that the concentration was unresolved. This was done for both the 1980 and the 1987 data bases.

4. Description of Data Bases File Structure

In order to conserve computer storage space by eliminating repeated fields, the data base has been divided into seven files. These can be easily linked together on key fields using simple dBase III+ commands or the dBase III+ utility programs provided with the data base. The data files, their sizes and the number of records they contain, are given in Table II-2. Their structures were outlined previously in Table II-1.

Table II-2. Number of Records in the 1987 VOC Data Base Files

Name	Number of Records	Size in Bytes
VOC_AMBI.DBF	122,820	12,773,890
VOC_INDO.DBF	52,810	5,493,248
VOC_MTHD.DBF	11,603	429,537
VOC_SITE.DBF	2,082	160,636
VOC_REFS.DBF	313	206,012
VOC_REFS.DBT	--	14,849
VOC_CHEM.DBF	320	89,600
VOC_LOC.DBF	832	73,370

The following paragraphs provide a detailed discussion of the purpose of each file and its fields. All fields with the same name, regardless of the file in which they are found, contain similar information and are the key fields. The contents of these fields will only be explained for the file in which they are first encountered.

In general, character fields which contain numbers, REF__ID for example, are right justified. The one exception is the CAS__NO field which is left justified. All entries are in uppercase for all files with the exception of VOC_REF.DBF which is in both upper and lower case.

VOC__AMBI.DBF and VOC__INDO.DBF: The largest files contain ambient and indoor daily average concentrations and supporting information respectively. These files also contain the data quality evaluation ranking and rating. Both of these files have the same structures. VOC___AMBI.DBF contains the ambient concentration data, while VOC_INDO.DBF contains the indoor and associated ambient data.

REF_ID: This field contains the number of the reference from which the data is drawn. Reference numbers for the 1987 data base begin with number 242.

SITE_ID: Site numbers were assigned beginning with 1 for each reference. Therefore, both the reference and the site number are required to uniquely define a site and both must be used in linking files together. In cases where more than one method was employed for sampling or analysis of a particular chemical, a different site number was assigned to data from each method.

CHEM___ID: The chemical identification number is a three character number unique to this data base. These chemical identification numbers serve the same function as the chemical identifiers used in the 1980 data base but they are not identical for reasons explained in Section I.B.3. A list of the chemical identifiers from the 1980 data base and their corresponding values for this update are contained in Appendix A. The new numbers were derived from an ordered list of the CAS numbers. Therefore, they are essentially arbitrary. This renumbering was necessitated by the addition of more than 150 new chemicals to the data base. The hazard categories from the 1980 data base have been eliminated as explained in Section II.B.3.

CONC_PPB: This field contains the concentration in parts per billion by volume. In the case where more than one sample was taken per day, the concentrations were, in general, averaged and weighted by sampling time when the sampling time varied over the course of one day. For the case in which more than one sample was included in the average, values less than the minimum quantifiable limit (MQL) were included as one half of the MQL when the MQL was given. If the MQL was not given, values less than MQL will be

included as zeros in the average. If the resulting average was less than the MQL, a zero was entered into the data base, otherwise the calculated average was input. When only a daily average concentration was reported as less than MQL, zeros were input.

RSD: The relative standard deviation is expressed in percent. It is the standard deviation of the concentration divided by the average concentration multiplied by 100. This could be either the computed RSD for the multiple samples comprising a single record in the data base of the estimated RSD for repetitive measurements using the sampling and analysis techniques.

NUM_SMPLS: This field gives the number of samples used to compute the average concentration.

MIN_CONC: The minimum concentration included in the average. This field is blank when the record represents only one sample.

MAX_CONC: The maximum concentration included in the average. This field is blank when the record represents only one sample.

NUMLESSMQL: The number of concentration values included in the average which are less than the minimum quantitation limit.

START_DATE: The date on which sampling began. In the case of samples where no day of the month or month of the year is provided, the start date was input as the first day of that month or year and the stop date as the last day of that month or year. While it was recognized that a null value for the day or month would have eliminated confusion on this point, dBase III+ requires a value.

START_TIME: The time at which sampling began, based on the 24 hour clock. If no time was given "0000" was entered.

STOP_DATE: The date on which sampling ended. See START_DATE.

STOP_TIME: The time at which sampling ended, based on the 24 hour clock. If no time was given "0000" was entered.

DELAY_HRS: The time between sampling and analysis, in hours. We did not distinguish between cases where the delay time was actually zero (i.e. direct sampling) and cases where the delay time was not given.

RANKING: See Section III for a full discussion of ranking.

VOC_AMBI.DBF and VOC_INDO.DBF (cont.)

RATING: See Section III for a full discussion of the 1980 quality code and the 1987 rating. This field includes both the quality code which was assigned to the 1980 data base (for reference numbers less than 242) and the rating assigned to this update for reference numbers 242 and greater. The quality code is also explained in the section on rating.

SAMP_DUR: The duration of sampling. Encoded as below.

<HR - less than one hour
HR - one hour
>HR - more than one hour
DA - one day (24 hours)
>DA - more than one day but less than one week
WK - one week
>WK - more than one week
??? - unknown

COMMENTS: Any pertinent information which did not logically fit into other fields was included here. The duplication of co-eluting chemicals, such as m/p-xylene, (as explained in Section I.B.3), was noted in this field. The sampling height for aircraft samples was also given in this field. The simultaneous measurement of indoor/outdoor concentrations or gaseous/particulate concentrations were also noted in this field.

VOC___MTHD.DBF: The second largest file contains information on sampling and analysis methods and minimum quantitation limits. It contains one record for each chemical at each site for each reference of VOC_AMBI.DBF and VOC_INDO.DBF.

REF_ID: Defined earlier.
SITE_ID: Defined earlier.
CHEM_ID: Defined earlier.

SAMP_MTHD: The sampling method was encoded as below. In cases where more than one method was employed for sampling or analysis of a particular chemical, a different site number was assigned to data from each method.

DIRECT	The sample was either taken directly by the analytical instrument or analyzed immediately.
PRESSCAN	Pressurized canister.
ABSRES	Absorbing resin, exclusive of TENAX.
TENAX	
TENAXDV	TENAX, distributed volume.
BAG	
COLDTRAP	
BUBBLER	
PASSIVE	

ANAL_MTHD: The analysis method was encoded as below. In cases where more than one method was employed for sampling or analysis of a particular chemical, a different site number was assigned to data from each method.

GC	Gas chromatography with unknown detector.
GC/ECD	GC with electron capture detection.
GCECCOUL	GC with electron capture/coulometric detection.
GCFIDFPD	GC with flame ionization or photometric detection.
GC/MPD	GC with microwave plasma detection.
GC/MS	GC with mass spectrometry.
GC/PID	GC with photoionization detection.
GLC/TEA	Gas liquid chromatography with thermal electron activation.
HPLC	High performance liquid chromatography.
FTIR	Fourier transform infrared spectroscopy.
THC	Total hydrocarbon analysis.
CHEMILUM	Chemiluminescence.
BIOASSAY	
WETCHEM	Wet chemical methods used in analysis of aldehydes included two new analysis methods, added, chromotropic acid and pararosaniline. Where possible, the specific method of analysis was substituted for WETCHEM in the 1980 data base.
CTA	Chromotropic acid
P-ROSE	Pararosaniline
DNPH	Dinitrophenyl hydrazine
GCPIDHEC	GC Photoionization detector, Hall Electrochemical

MQL: This field contains the lower quantifiable limit (LQL) which represents the variability of field blanks, when it was available, in parts per billion by volume. If a minimum detection limit (MDL) which represents the sensitivity of the laboratory method and is lower than the LQL, was given rather than a minimum quantifiable limit (MQL), this was input instead.

VOC_SITE.DBF: The third largest file contains information on the sampling sites. Site numbers were assigned beginning with 1 for each reference. Therefore, both the reference and site numbers are required to uniquely define a site and both must be used in linking files together.

REF_ID:	Defined earlier.
SITE_ID:	Defined earlier.

SITE_TYPE: The site type was encoded as below. We found that assigning a value to this field was often difficult due both to lack of primary information about the sampling sites and to inconsistent use of terms. Distinction between suburban and urban

was difficult to make. When possible, we have used the site type as defined by the authors. In the case of aircraft samples, the site type corresponds to the surface over which it was sampled. For example, a sample taken over Houston would be designated urban and the sampling height noted in the comments field of VOC_AMBI.DBF and VOC_INDO.DBF.

RE	-	Remote (e.g. coastal or free tropospheric)
RU	-	Rural
SU	-	Suburban
UR	-	Urban
SD	-	Source dominated
IR	-	Indoor residential
IW	-	Indoor workplace, this does not include industrial exposures, rather it is to distinguish samples collected in offices from those collected in homes.
PR	-	Personal, this does not include industrial exposures.

LATITUDE In degrees and fractions of a degree. If no specific value was given, we used center city values. This value is often not available for indoor samples. Because characteristics of the building being sampled are more important than exact geographic location, we did not pursue this value if it was not provided.

LONGITUDE In degrees and fractions of a degree. See LATITUDE.

SITE_ADDR The address of the sampling site. For indoor samples, where an address is rarely given, this field includes more pertinent information when it was provided, such as the air changes per hour, age of the house, number of smokers, site identifier from the original reference, etc.

CITY: The city in which the sampling site is located.

STATE: The state in which the sampling site is located. The standard two digit code was used.

SAROAD_NO: The SAROAD (Storage and Retrieval of Aerometric Data) number when it was available.

VOC_REFS.DBF: This file contains bibliographic information on data sources. The references used in this update were numbered sequentially beginning with reference 242. While all 241 references from the 1980 data base are included in this file, data was extracted from only 61 of these references. Table II-3 lists the number of records extracted from each of the references. This file has an associated VOC_REF.DBT file which contains the text of the memo field.

REF_ID: Defined earli

CHEMS__MEAS: The chemical identification number (CHEM_ID) for all the chemicals for which information was extracted from that reference.

PRININVEST: The principal investigator.

AUTHORS: The authors of the report or journal article or the individual responsible for sampling and analysis.

TITLE: The title of the report of journal article or the agency or institution from whom the data was obtained.

CITATION: The standard journal citation or the report number and institution which prepared the report.

YEAR: The year in which the reference was published or the data was provided.

NUM__RECORD: The number of records in VOC__AMBI.DBF and VOC INDO.DBF which were extracted from the reference.

OBJECTIVE: The objectives of the study. This field also contains information on other measurements which may have been made simultaneously, such as meteorology and particulate matter, or other pertinent comments.

VOC__CHEM.DBF: This file contains information on the chemicals for which data were extracted. Data were extracted on 170 chemicals in addition to the 151 from the 1980 data base, as explained in Section II.B.3, bringing the total to 320. This necessitated a reassignment of the chemical identification numbers developed for the 1980 data base. This is discussed in more detail in Section II.3.B. In general, this file follows CAS conventions, as noted below. This file can be used in conjunction with VOC_LOC.DBF, the chemical locator file, which lists both synonyms of the chemicals included in the data base as well as related chemicals, and is explained below.

CHEM_ID: Defined earlier.

CAS_NO: The registry number assigned by CAS.

CAS_NAME: The name assigned by CAS.

SYNONYMS: While an attempt was made to include all the common synonyms for the chemical, this list is by no means exhaustive. Names are separated by semi-colons.

FORMULA: The chemical formula, written following CAS conventions.

Table II-3. Number of Records Extracted from Each Reference

Ref. No.	No. of Records	Ref. No.	No. of Records	Ref. No.	No. of Records
6	42	196	16	266	18
10	32	199	1	267	8
13	45	204	69	268	8
20	694	205	172	269	15
21	1058	206	877	270	28
27	1	220	7	271	12
28	21	222	6	272	34
39	1848	227	12	273	24
41	70	229	1686	274	12
48	9	230	1	275	2317
55	13	231	6	276	2470
59	8	232	189	277	250
62	7	233	30	278	4203
71	13	234	13	279	872
72	7	235	297	280	16
73	11	236	49	281	21
74	3	237	95	282	63
75	55	238	45	283	56
96	6	239	770	284	7217
105	5	240	6	285	554
106	37	241	8	286	45
108	101	242	56	287	3
109	9	243	149	289	16
118	7	244	28	290	569
120	5	245	13	291	141
122	67	246	120	292	8
125	16	247	854	293	41
126	335	248	2	294	4
127	431	249	101	295	1966
139	10	250	237	296	164
140	28	251	22	297	65
144	3233	252	37,458	298	3244
161	112	253	2329	299	1744
169	116	254	5616	300	4267
170	69	255	1037	301	5498
172	168	256	4104	302	1093
173	1308	257	6,742	303	132
174	99	258	378	304	425
175	725	259	984	305	20
179	49	260	48	306	101
184	10	261	505	307	527
185	15	262	865	308	18,165
188	350	263	53	309	11,634
191	27	264	42	310	2,436
194	5	265	8	311	17,550
195	55			312	18
				313	184

NUMCARBONS: The number of carbon atoms in the molecule, used to convert values from parts per billion Carbon (ppbC) to parts per billion volume (ppbv). Divide ppbC by number of carbon to get ppbv.

MOL_WT: The gram molecular weight.

PPB_2_UGM3: The factor used to convert values from parts per billion volume to micrograms per cubic meter. The concentration in ug/m^3 is the product of the concentration in ppbv and the conversion factor.

VPVAL: The value of the vapor pressure, when available.

VPUNITS: The units of the vapor pressure, when available.

COMMENTS: Any pertinent information which does not logically fit in any of the above fields.

VOC_LOC.DBF: This locator file lists synonyms and isomers of the chemicals in the data base. If specific isomers of a chemical have data in the data base, the general term of that chemical is included in VOC__LOC.DBF and vice versa. It can be used as an aide to locating chemical identification numbers.

CHEM_ID: This field is as explained above. It will contain a value only when the name is a synonym for a chemical actually included in the data base.

CAS__NO: the CAS registry number. This is given for all chemicals where the number could be located.

CHEM__NAME: This field contains a chemical name. The name may be either the CAS name for the chemical or a common name given to the chemical.

RELCHEMID: This field contains related chemical identification numbers of related compounds, specifically the identification numbers of other isomeric forms with the same chemical name.

III. RANKING AND RATING

In this section, we discuss the development of our ranking and rating system to assess data quality and the results of a pilot study.

A. Background

Many data bases include data quality codes for overall data quality. The 1980 VOCs data base included such a one-digit code (1 through 4) corresponding to the potential error limits of the data. Code Z was input when the authors of the data base were unable to assign a quality code. The 1980 codes and their meanings are included in Table III-1.

Assignment of quality codes in the 1980 data base was subjective. The authors integrated the available published and unpublished information along with their personal knowledge and experience to arrive at quality codes for the data (Table III-1).

For the new data in the 1987 VOCs data base, we developed a two-step quality code procedure in an attempt to make the process less subjective and the codes more meaningful. No attempt was made to reassign ranking and ratings to the 1980 data base, and the original quality codes have been retained for these data.

B. Approach

Instead of reporting a composite score for the data quality as was done for the 1980 data base, we report two scores: data ranking and data rating. Ranking is a multi-digit number which gives a numerical evaluation of factors affecting data quality. Ranking digits range from 0 to 5. Ranking is useful to researchers familiar with VOCs measurements. The separate digits of the ranking were combined to yield a weighted average composite which was used to assign rating which is an overall evaluation of data quality. The composite rating score range was A to D, and Z. Rating is useful to those not familiar with VOCs measurement processes or not interested in detailed factor scores. The ranking step, which we have included explicitly in the 1987 VOCs data base, was implicit in the quality code for the existing 1980 VOCs data base.

1. Pilot Study

We performed a pilot study to evaluate the data extraction procedure and the appropriateness of the ranking and rating system. Ten references were extracted and assessed for quality as described above. All members of the Project Advisory Committee (PAC) and EPA staff were asked to review and evaluate these scoring methods.

For the pilot study, a preliminary list of factors affecting data quality (Table III-2) was developed. The eleven factors originally proposed were too many to be evaluated usefully and the eleven-digit number for ranking was too long to be scanned quickly. The eleven factors were combined to yield four factors titled; methodology, quantification, representativeness, and documentation for the pilot

Table III-1. 1980 VOCs Data Base Quality Codes[1]

Quality Code	Description[2]	Category
1	ß = 1.25	Excellent
2	ß = 1.50	Good
3	ß = 2.00	Acceptable
4	ß > 2.0	Questionable
Z	Unable to Assign quality code	

1. The information to make a quantitative assessment was lacking, and the authors had to rely on their own experience and judgment. Assignment of codes included consideration of original researcher's comments, appropriateness of analytic techniques, known limits of techniques' accuracy, and magnitude of reported concentrations.

2. The factor ß establishes the probable "best" error limits of the data assuming good practices were followed in sample collection and analysis. The "true" concentration is judged to be within a factor of ß from the measured concentration (e.g., a measurement of 100 with quality code 2, ß=1.5, implies that the "true" concentration may lie between 66.7 and 150).

Source: Brodzinsky and Singh (1983)

Table III-2. Factors Affecting Data Quality

Factors Included in the Pilot Study	Combined Final Factors
• Appropriateness of Sampling and Analysis Methods.	• Methodology.
• Calibration procedure and use of standards.	• Quantification.
• Comparison with other reported data.	• Documentation.
• Artifact problems.	
• Precision of the method.	
• Documentation.	
• Observed concentration relative to limits of detection.	
• Internal consistency.	
• External laboratory QA.	
• Objective of monitoring.	
• Meteorological influences.	

study. These factors were scored on a scale of 0 to 9. For calculating a composite average these four factors were assigned weights of 10, 10, 7.5 and 5, respectively. The composite scores were divided into classifications and assigned a one-digit rating which reflected overall data quality. A minimum value (or screen) was designated for the first two factors (methodology and quantification). Data falling below this screen are considered questionable. In cases where one of these two factors falls below the screen, the data are given a rating of E (not computed). This protects against erroneous rating of questionable data.

The scoring method and rating system were modified in consultation with the EPA Project Officer. Because this is a sensitive issue, we emphasize that any such quality scoring system has limitations. Furthermore, the importance of data quality depends on applications.

2. Results of the Pilot Study

Based on the comments from the pilot study review, the rating and ranking methodology was modified as follows:

- The factor, "representativeness", was judged too vague and subjective. It was eliminated.
- The factor scoring scale of 0 to 9 was judged to be too broad and conducive to subjective judgment. Instead, a scale of 1 to 5 with more objective descriptions was judged to be more consistently applied by the various individuals doing the ranking.
- The program used to calculate rating from ranking has been provided in the data base. This will permit future changes or manipulations of the scoring scale and factor weights.
- Due to the controversial nature of rating and ranking the data, the possibility of not performing a quality assessment was discussed. However, it was felt that data quality codes, although controversial, were valuable. Users who strongly object to this procedure can always ignore the quality codes for their application or assign a different code to their copy of the data base.
- The weights given to the factor scores for computing the rating were found to be reasonable.

3. Ranking

The new data included in the 1987 data base were evaluated and scored on each of the three factors selected from the pilot study. These are:

- Methodology;
- Quantification; and,
- Documentation;

A scale of 1 to 5 was used. A value of Z was assigned to data that could not be evaluated to be consistent with the 1980 data base. Each digit of the ranking is the score for one of the factors listed above, in that order. A brief description of the factors and their weights in the composite score is included in Table III-3. These were determined by a consensus among the authors, the EPA Project Officer, and some of the PAC members. The factor scoring scheme is included in Table III-4 for all factors.

Factor Scoring

A factor score of 5 represents excellence or perfection. Since improvements can always be made on all aspects of VOCs data, none of the factors were given a score of 5.

A factor score of 4 represents the use of exemplary practices. When good, but commonplace, procedures were used, a score of 3 was given. Most of the references were given a score of 3 for most factors. A score of 2 was given when the procedure was only adequate or satisfactory. A score of 1 was considered to be "questionable." Application of this small range of the ranking process provided more consistent scores: two or more independent reviewers assigned the same ranking to the data. The data ranking is the list of each factor's raw score. Different chemicals, and sometimes different samples, were given individual ranking and rating. Table III-5 lists the ranking for most of the chemicals and a majority of the data in each reference included in the 1987 data base.

The number of references which fell into each ranking level is given in Table III-6.

Factor Weight

Since not all three factors affect data quality equally, different weights were assigned to each factor. This weight represents the relative importance of that factor to data quality for this data base. Documentation, though important for data assessment, was considered less important than methodology and quantification for data quality. Although methodology is important, quantification was deemed to be more important. The factor weights of 30%, 50%, and 20% were assigned to methodology, quantification, and documentation, respectively.

Composite Score

The factor scores (Table III-4) were multiplied by the factor weights (Table III-3) and added together to calculate a composite score. The theoretical composite score range was 1 to 5.

Table III-3. Description and Factor Weights for the Ranking Factors

Factor	Weight	Brief Description of the Factor
Methodology	0.3	Appropriateness of sampling and analysis methods (including collection efficiency, sample stability, and analytical sensitivity). This is the first digit of the ranking.
Quantification	0.5	Internal and external QA, QC, calibration procedures and frequency, observed concentration relative to the detection limit, internal consistency, precision, representativeness of the concentration as a daily average. This is the second digit of the ranking.
Documentation	0.2	Documentation, including objective of monitoring, peer review, standard operating procedures, comprehensive description of all procedures, description of ancillary information (e.g. meteorology). Includes personal communication in absence of written available documentation. This is the third digit of the ranking.

Table III-4. Factor Scoring Scheme for the Project

Factor Score	Description
5	Excellent
4	Good
3	Average
2	Satisfactory
1	Questionable
Z	Unable to Assign

Composite Score	Rating	Description
> 3.6-5.0	A	Very Good
3.0-3.6	B	Good
2.3-2.9	C	Average
2.0-2.3	D	Satisfactory
	Z	Unable to Assign

$$\text{Composite Score} = \sum_{i=1}^{3} W_i F_i \text{, where } W_i = \text{weight of the factor, i}, \quad F_i = \text{score for the factor, i}$$

Table III-5. Rating and Ranking for Each Reference for Most Chemicals

Record#	REF_ID	RANKING	COMPOSITE	RATING	PROJECT NAME/AUTHORS
1	126	334	3.20	B	HYDROCARBON/EPA/LONNEMAN
2	242	334	3.20	B	CARBONYLS/ GROSJEAN
3	243	333	3.00	B	CARBONYLS/GROSJEAN
4	244	434	3.50	B	MONOTERPENE/HOLDREN
5	245	434	3.50	B	METHYLCHOLOROFORM/MAKIDE
6	246	232	2.50	C	FORMALDEHYDE/BAAQMD
7	247	333	3.00	B	HYDROCARBON/PA/WESTBERG
8	248	444	4.00	A	CARCINOGENS/SINGH ET AL.
9	249	334	3.20	B	ALDEHYDES/MENG
10	250	333	3.00	B	PAN/LEWIS ET AL.
11	251	333	3.00	B	INDOOR/MONTEITH
12	252	434	3.50	B	NMOC/McELROY
13	253	444	4.00	A	EPA/SINGH ET AL.
14	254	234	2.90	C	ATEOS/LIOY
15	255	434	3.50	A	TAMS/EPA/WALLING
16	256	332	2.80	C	DATA/CLARK COUNTY, NV
17	257	334	3.20	B	CARB/SAJ
18	258	444	4.00	A	BATTELLE/HOLDREN
19	259	323	2.50	C	HOAS/LONNEMAN
20	260	334	3.20	B	INDOOR/OFFERMAN/LBL
21	261	444	4.00	A	METHYL CHLORIDE/EDGERTON
22	262	434	3.50	B	INDOOR/BELL LABS/SHIELDS
23	263	334	3.20	B	INDOOR/TURIEL
24	264	334	3.20	B	INDOOR/LBL/HODGSON
25	265	324	2.70	C	INDOOR/LBL/SCHMIDE
26	266	334	3.20	B	INDOOR/LBL/OFFERMANN
27	267	334	3.20	B	INDOOR/LBL/BERK
28	268	334	3.20	B	INDOOR/LBL/MIKSCH
29	270	334	3.20	B	INDOOR/LIPSCHUTZ
30	271	444	4.00	A	METHANE/ROWLAND
31	272	444	4.00	A	TCF METHANE/HUSAIN
32	273	334	3.20	B	FORMALDEHYDE/LIPARI
33	274	333	3.00	B	HALOCARBON/RUSSELL
34	275	4Z4	0.00	Z	BALTIMORE/VERSAR
35	276	334	3.20	B	CLEVELAND/BATTELLE
36	277	343	3.50	B	FORMALDE. PHIL./LAZENKA
37	278	333	3.00	B	CHICAGO/WESTBERG
38	279	434	3.50	B	1983/EPA/SINGH ET AL
39	280	334	3.20	B	FORMALDEHYDE/KONOPINSKI
40	281	434	3.50	B	NONMETHANE/GREENBERG
41	282	234	2.90	C	FORMALDEHYDE/SCHUTTE
42	283	234	2.90	C	INDOOR/HODGSON
43	284	234	2.90	C	N.J./EPA/BOZZELLI
44	285	334	3.20	B	HYDROCARBON/EPA/WESTBERG
45	286	434	3.50	B	LONG PATH/EPA/TUAZON
46	287	333	3.00	B	N.J./LAGOMARSINO
47	288	344	3.70	A	LINCOLN TUNNEL/LONNEMAN

Table III-5. Rating and Ranking for Each Reference for Most Chemicals
(Continued)

Record#	REF_ID	RANKING	COMPOSITE	RATING	PROJECT NAME/AUTHORS
48	289	334	3.20	B	L.A./EATOUGH
49	290	334	3.20	B	REMOTE/ROBERTS
50	291	324	2.70	C	SHALE OIL/HAWTHORNE
51	292	323	2.50	C	INDOOR/LBL/BERK ET AL
52	293	334	3.20	B	INDOOR/LBL/TRAYNOR ET AL
53	294	334	3.20	B	INDOOR/LBL/YOUNG ET AL
54	295	333	3.00	B	FORMALDEHYDE/BAAQMD
55	296	334	3.20	B	COMP.ANLS./PELLIZZARI
56	297	334	3.20	B	MONOTERPENE/ROBERTS
57	298	4Z2	0.00	Z	PHILADELPHIA/VERSAR
58	299	344	3.70	A	INDOOR/OAK RDG/HAWTHORNE
59	300	333	3.00	B	BAY AREA/KOPPE
60	301	434	3.50	B	LIFETIME/PRINN
61	302	3Z3	0.00	Z	NONMETHANE/McALLISTER
62	303	233	2.70	C	LONG PATH/HANST
63	304	434	3.50	B	BENZENE/RASMUSSEN
64	305	434	3.50	B	VOC/RASMUSSEN
65	306	434	3.50	B	METHANE/KHALIL
66	307	444	4.00	A	KANAWHA VALLEY/BATTELLE
67	308	334	3.20	B	INDOOR/TEAM/EPA/WALLACE ET AL.
68	309	334	3.20	B	INDOOR/TEAM/EPA/WALLACE ET AL.
69	310	334	3.20	B	INDOOR/TEAM/EPA/WALLACE ET AL.
70	311	334	3.20	B	INDOOR/TEAM/EPA/WALLACE ET AL.
71	312	334	3.20	B	CRYOGENIC/SHEPSON
72	313	434	3.50	B	HALOGENATED/SIMMONDS

Ranking of Ranking Digits	2 to 4
Range of Ranking	222 to 444
Range of Composite	0. to 4.00
Range of Rating	A to C and Z

Table III-6. Number of References by Ranking Factor

RANKING SCORE LEVEL	RANKING FACTOR		
	METHODOLOGY	QUANTIFICATION	DOCUMENTATION
5	0	0	0
4	22	10	55
3	44	55	14
2	6	4	3
1	0	0	0
Z	0	3	0

4. Rating

The composite score range was partitioned for rating. This range and its relation to rating are given in Table III-4. The rating classifications were limited to five categories (A to D and Z) as was done for the 1980 VOCs data base quality codes and other EPA quality codes. However, the 1980 data base quality codes have been retained as digits 1 to 4 and Z, which do not correspond directly to the 1987 data base rating. The short rating description in Table III-4 is not rigid.

Concentrations which are near detection limits should receive a lower ranking and rating. However, time constraints did not allow us to do this.

Table III-7 lists number of references which fell into each rating category. Although the system of ranking and rating described here is still subjective, we attempted to broaden the perspective by having several researchers initially score the data and distribute the ranking to the PAC members for their review and comments. Data base users should weigh the applicability of this scheme to their requirements before making use of the ranking and rating scores.

Table III-7. Number of References by Rating Category

RATING CATEGORY	NO. OF REFERENCES
A	10
B	48
C	11
D	0
Z	3

IV. QUALITY ASSURANCE

In order to ensure accuracy of the data transfer, the following elements of a QC procedure were an integral part of the data-gathering process in this project. Each QC procedure and its usefulness is briefly described below.

- Only experienced data entry personnel were used.

  The emphasis on data entry was mainly on accuracy of data entry, and not on speed. All data entry personnel were experienced and understood the importance of data accuracy in this project. Data entry personnel worked for short lengths of time in a given day to avoid errors induced by fatigue and boredom.

- Electronic data transfer.

  Much of the data obtained for this data base was in the form of diskettes or magnetic tape and was transferred directly into a dBASE III format. Data were checked to evaluate the transfer operation for accuracy.

- Only one person extracted all of the data from each reference. This effort was followed by quality checks done by the Project Manager. This allowed for data extraction consistency and accuracy. The quality check on 10 percent re-extraction did not find many errors.

- Data Screens in Data Entry Programs

  The dBASE III+ software package contains simple error-checking routines to flag data errors. The data entry programs written for this project were user friendly with prompts and contained error checks so that values outside the range of possibilities were rejected along with a sound prompt. The data entry person had to check and correct the error before proceeding. All data entries were checked independently to identify errors.

  - Project Advisory Committee (PAC) Review

    Starting with the Work Plan, this project has been reviewed by the seven PAC members (EPA staff and other scientists interested in this project) for accuracy and validity of data evaluation and reporting.

  - Graphical Data Display and Analysis

    Scatterplots and other graphical display techniques to identify "outliers" or potentially erroneous data were employed. Data outliers were re-checked when possible to ensure that the information was correct.

V. SUMMARY

This section summarizes the VOCs data collected. This task was a major objective of this study. The data summary includes all data and is presented without interpretation of its meaning. This data base has been described and its application exemplified by Shah et al., 1987a and b; Shah 1988a, b, and c; and Shah and Heyerdahl 1988.

The partial list of potential applications of the soft form data base (on PC-compatible diskettes) includes:

- Chemical concentration distribution investigation
- Pattern or trend analysis
- Intersite concentration variations and their reasons
- Location of "hot spots"
- Use with census data for preliminary risk assessment
- Input to dispersion and receptor modeling
- Establishing monitoring priorities
- Review of detection limits or analysis methods in use and their appropriateness
- Identity of active researchers
- Several others

It needs to be emphasized that the data assembled here comes from many different studies with a wide variety of objectives, sampling time and methods, and analytical techniques. Thus it has inherent limitations which must be kept in mind while drawing any conclusion. In general, this data base can best be used as a screening tool.

Tables V-1 and V-2 summarize the daily (24 hr.) average concentrations and numbers of observations for ambient and indoor data base in ppbv. The ambient daily average includes the five site types (remote, rural, sub-urban, urban, and source dominated). The indoor daily average includes the three indoor site types (indoor residential, indoor offices, and personal) and a small amount of ambient data included with the indoor references. A blank entry in the table indicates that no data was available in the data base.

The lower and upper quartile values represent the 25% and 75% values. When the upper quartile value is lower than the average, it implies that the average is unduly influenced by a few high values. When median and/or upper quartiles are zero, it implies that much of the data were zero's. When the number of samples were one, the measured values were put it the average column. Considering the diversity of sampling locations, all values in these tables should be used only as a guideline in determining a chemical's concentration.

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Upper
1	MYRCENE	50	0.000	0.000	0.000	0.000
3	CUMENE	14	0.000	0.000	0.000	0.000
4	BUTYNE	21	0.581	0.052	0.030	0.738
5	FORMALDEHYDE	629	8.293	4.060	1.900	9.800
7	CARBON TETRACHLORIDE	4913	0.168	0.122	0.070	0.130
9	ANILINE	5	18.263	0.000	0.000	1.313
10	DIMETHYLNITROSAMINE	42	0.583	0.014	0.006	0.065
11	FORMIC ACID	29	4.069	4.000	2.000	6.000
13	ACETONE	17	6.927	0.93	0.000	2.827
14	CHLOROFORM	3658	0.630	0.058	0.010	0.180
15	HEXACHLOROETHANE	69	0.001	0.000	0.000	0.000
16	BENZENE	5411	2.800	1.665	0.630	3.343
17	TRICHLOROETHANE	2982	0.911	0.162	0.129	0.610
18	METHANE	244	2155.0	1657.0	1600.0	2154.0
19	BROMOMETHANE	358	3.097	0.179	0.046	3.100
20	ETHANE	913	18.689	9.685	5.380	18.000
21	ETHENE	833	17.786	9.980	5.700	18.000
22	ACETYLENE	888	9.652	5.405	2.898	10.815
23	CHLOROMETHANE	706	0.740	0.652	0.607	0.721
24	IODOMETHANE	167	0.019	0.003	0.002	0.009
25	DIBROMOMETHANE	21	0.835	0.000	0.000	0.013
27	PROPANE	886	11.364	6.332	3.333	12.617
28	1-PROPYNE	76	0.000	0.000	0.000	0.000
29	CHLOROETHANE	190	85.130	0.063	0.021	0.637
30	VINYL CHLORIDE	701	12.376	0.000	0.000	0.301
31	ACETONITRILE	4	0.024	0.000	0.000	0.048
32	ACETALDEHYDE	175	5.107	1.3	0.000	5.440
33	METHYLENE CHLORIDE	798	1.619	0.774	0.314	1.809
34	CARBON DISULFIDE	29	0.098	0.043	0.040	0.162
35	THIOBISMETHANE	360	2.111	0.995	0.467	2.334
37	BROMOFORM	496	0.000	0.000	0.000	0.000
38	BROMODICHLOROMETHANE	495	0.002	0.000	0.000	0.000
39	2-METHYLPROPANE	887	5.706	3.290	1.728	6.213

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
40	1,1-DICHLOROETHANE	145	0.038	0.009	0.000	0.054
41	1,1-DICHLOROETHENE	1275	4.621	0.000	0.000	0.000
42	PHOSGENE	10	0.023	0.020	0.015	0.030
43	CHLORODIFLUORO-METHANE (CFC-22)	42	6.001	0.985	0.027	5.370
45	TRICHLOROFLUORO-METHANE (F-11)	1507	0.252	0.196	0.187	0.208
46	DICHLORODIFLUORO-METHANE (F-12)	1080	0.438	0.334	0.321	0.346
47	TETRAFLUORO-METHANE	8	0.101	0.083	0.070	0.131
48	TETRAMETHYL-PLUMBANE	2	0.004	0.004	0.002	0.005
49	2,2-DIMETHYLBUTANE	557	0.329	0.243	0.133	0.417
50	MONOMETHYLESTER-SULFURIC ACID	8	0.650	0.470	0.325	0.706
51	DIMETHYL-BUTANONE	206	0.288	0.000	0.000	0.000
52	PENTACHLOROETHANE	68	0.008	0.000	0.000	0.000
53	TRICHLORO-TRIFLURO-ETHANE (F-113)	184	0.346	0.133	0.063	0.330
54	DICHLOROTETRAFLUORO-ETHANE (F-114)	171	0.045	0.030	0.023	0.038
55	HEXACHLOROCYCLO-PENTADIENE	184	0.346	0.133	0.063	0.330
56	DIMETHYL SULFATE	8	1.456	1.255	0.717	1.893
57	TETRAETHYLPLUMBANE	2	0.001	0.001	0.000	0.001
58	1,2-DIBROMOPROPANE	17	0.000	0.000	0.000	0.000
59	2-METHYLBUTANE	885	12.548	7.716	4.240	13.408
60	2-METHYL-1,3-BUTADIENE	638	0.608	0.334	0.160	0.628
61	1,2-DICHLOROPROPANE	714	0.160	0.022	0.011	0.065
62	METHYL ETHYL KETONE	280	0.638	0.000	0.000	0.000
63	1,1,2-TRICHLORO ETHANE	886	1.103	0.000	0.000	0.026
64	TRICHLOROETHENE	3021	0.495	0.158	0.010	0.470
65	2,3-DIMETHYLBUTANE	760	0.869	0.590	0.344	0.988
66	TETRACHLOROETHANE	1011	0.101	0.000	0.000	0.008
68	DIMETHYL-3-METHYLENE-BICYCLO-HEPTANE	45	0.057	0.045	0.016	0.100
69	A-PINENE	1032	0.484	0.103	0.023	0.264

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
71	HEXACHLORO-BUTADIENE	72	0.036	0.003	0.001	0.006
72	METHYLNAPHTHALENE	64	0.086	0.018	0.000	0.063
73	NAPHTHALENE	67	0.991	0.223	0.038	1.087
74	QUINOLINE	3	0.063	0.000	0.000	0.189
75	METHYLNAPHTHALENE	17	0.011	0.000	0.000	0.000
76	PHENYL-PROPANONE	2	0.095	0.095	0.092	0.097
77	DIMETHYLBENZENE	3592	7.513	0.690	0.233	1.496
78	O-CRESOL	35	2.221	0.339	0.000	2.394
79	CHLORO-METHYLBENZENE	309	0.113	0.040	0.010	0.130
80	DICHLOROBENZENE	1052	1.304	0.000	0.000	0.038
81	TRIMETHYLBENZENE	1018	1.368	0.940	0.567	1.511
82	TETRAMETHYLBENZENE	68	0.314	0.015	0.007	0.085
83	DIBROMO-3-CHLORO-PROPANE	3	0.001	0.000	0.000	0.002
84	3-METHYLPENTANE	867	2.550	1.525	0.845	2.633
85	3-PENTANONE	3	0.019	0.000	0.000	0.057
86	METHYLCYCLOPENTANE	812	1.700	1.026	0.581	0.729
87	(1-METHYLETHYL)-BENZENE	710	0.133	0.054	0.010	0.123
88	1-(METHYLETHENYL)-BENZENE	176	0.050	0.000	0.000	0.000
89	1-PHENYLETHANONE	35	0.722	0.074	0.011	0.551
90	NITROBENZENE	732	0.117	0.000	0.000	0.050
91	METHYL-METHYLETHYL-BENZENE	132	0.732	0.410	0.079	0.919
92	ETHYLBENZENE	2669	4.495	0.596	0.230	1.244
93	ETHENYLBENZENE	1123	0.361	0.117	0.000	0.340
94	BENZYLCHLORIDE	43	0.013	0.008	0.004	0.017
95	BENZONITRILE	4	0.022	0.010	0.006	0.038
96	BENZALDEHYDE	97	0.545	0.074	0.000	0.500
97	PROPYLBENZENE	758	0.211	0.156	0.084	0.263
98	BUTYLBENZENE	52	0.051	0.000	0.000	0.000
99	1,4-DIETHYLBENZENE	326	0.080	0.008	0.000	0.049
100	2,4-DIMETHYLPHENOL	3	0.067	0.000	0.000	0.200
101	DIMETHYLBENZENE	3518	10.493	1.558	0.520	3.270
102	CHLORO-METHYLBENZENE	310	0.204	0.090	0.020	0.290
104	DICHLOROBENZENE	947	0.996	0.042	0.000	0.200
106	DIBROMOETHANE	1980	0.323	0.000	0.000	0.010

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
107	3-BROMO-1-PROPENE	17	0.001	0.000	0.000	0.000
108	BUTANE	888	14.008	8.769	4.853	14.369
109	1-BUTENE	62	0.010	0.000	0.000	0.000
110	1,3-BUTADIENE	629	0.807	0.318	0.152	0.675
111	2-PROPENAL	49	6.318	6.000	3.700	9.000
112	BROMO-CHLOROETHANE	26	0.138	0.016	0.000	0.166
114	1,2-DICHLOROETHANE	2044	0.384	0.000	0.000	0.055
116	PROPANENITRILE	2044	0.384	0.000	0.000	0.055
117	2-PROPENENITRILE	70	4.016	0.265	0.070	1.198
119	2-METHYLPENTANE	871	3.325	2.194	1.140	3.673
120	2-PENTANONE	3	0.047	0.000	0.000	0.142
121	2,4-DIMETHYLPENTANE	802	0.612	0.300	0.157	0.556
123	1,3-DIMETHYLBENZENE	3146	11.463	1.411	0.576	3.200
124	M-CRESOL	3	0.301	0.000	0.000	0.904
125	2,4-DIMETHYLPYRIDINE	3	0.837	0.000	0.000	2.510
126	2,6-DIMETHYLPYRIDINE	3	0.304	0.000	0.000	0.913
127	TRIMETHYLBENZENE	585	0.803	0.204	0.040	0.511
128	DIMETHYLPHENOL	3	0.067	0.000	0.000	0.2
129	TRICHLORO-BENZENE	4	0.001	0.000	0.000	0.001
130	TRIMETHYL-PYRIDINE	3	0.605	0.000	0.000	1.816
131	BROMOBENZENE	26	0.224	0.024	0.000	0.175
132	METHYLCYCLOHEXANE	757	0.953	0.419	0.207	0.806
133	TOLUENE	4074	8.533	1.889	0.160	5.210
135	CHLOROBENZENE	1491	0.332	0.061	0.000	0.310
137	PHENOL	48	22.741	4.438	0.917	16.735
139	2-METHYLPYRIDINE	3	0.613	0.000	0.000	1.838
140	PENTANE	886	6.894	3.811	1.968	6.250
141	1-PENTENE	736	0.434	0.268	0.107	0.529
142	BROMO-CHLORO-PROPANE	6	0.023	0.002	0.001	0.057
143	1H-PYRROLE	3	0.121	0.000	0.000	0.364
144	TETRAHYDROFURAN	3	0.307	0.283	0.034	0.605
146	HEXANE	894	3.684	1.656	0.827	2.945

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
147	1,4-DICHLOROBUTANE	7	0.044	0.000	0.000	0.093
148	CYCLOHEXANE	712	1.047	0.359	0.163	0.73
149	CYLCOHEXENE	278	0.134	0.093	0.060	0.138
150	PYRIDINE	3	1.340	0.000	0.000	4.019
152	OCTANE	1144	0.761	0.333	0.166	0.763
153	1-OCTENE	476	0.110	0.045	0.026	0.077
155	NONANE	980	0.656	0.259	0.142	0.617
156	DODECANE	526	0.411	0.092	0.000	0.408
157	PROPENE	893	4.391	2.222	1.200	4.342
158	2-METHYL-1-PENTENE	62	0.003	0.000	0.000	0.000
159	2-METHYL-1-PROPENE	170	2.328	0.592	0.275	1.140
161	ISOQUINOLINE	3	0.000	0.000	0.000	0.000
162	TRICHLOROBENZENE	18	0.172	0.100	0.100	0.200
164	PROPANAL	31	11.751	8.100	1.300	22.900
165	BUTANAL	31	2.219	1.700	0.900	3.400
167	1,4-(DIOXANE)	617	0.107	0.000	0.000	0.040
168	1-NONENE	388	0.106	0.046	0.023	0.090
170	DECANE	1258	0.758	0.279	0.050	0.679
171	DIBROMOCHLOROMETHANE	510	0.032	0.000	0.000	0.000
172	2-CHLORO-BUTADIENE	5	0.118	0.000	0.000	0.000
173	TETRACHLOROETHENE	3226	0.853	0.350	0.120	0.870
174	DIMETHYL-METHYLENE-BICYCLO-HEPTANE	161	0.050	0.007	0.000	0.065
175	1,2-DIETHYLBENZENE	572	0.324	0.212	0.129	0.349
176	(1-METHYLPROPYL)-BENZENE	433	0.492	0.044	0.025	0.087
177	ACETIC ACID ETHYL-ESTER	5	0.578	0.733	0.161	0.777
178	1,3-DIETHYLBENZENE	563	0.125	0.063	0.000	0.148
179	CYCLOPENTENE	176	0.028	0.000	0.000	0.000
180	HEPTANE	1064	1.616	0.771	0.359	0.620
182	CIS-DICHLOROETHENE	161	0.326	0.037	0.000	0.113
183	TRANS-DICHLOROETHENE	2	0.744	0.744	0.560	0.928
184	CYCLOPENTANE	724	0.556	0.382	0.192	0.619

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV Average	Median	Quartiles Lower	Upper
185	CYCLOHEPTANE	159	0.105	0.057	0.021	0.126
186	1,2-PROPADIENE	50	0.036	0.000	0.000	0.000
187	CARBON OXIDE SULFIDE	18	0.494	0.511	0.456	0.527
188	2,2,3-TRIMETHYLBUTANE	50	0.725	0.228	0.000	0.621
189	TETRAMETHYLBENZENE	451	0.051	0.031	0.020	0.054
190	2,4,5-TRIMETHYLPHENOL	3	0.036	0.000	0.000	0.108
191	2-METHYL-2-BUTENE	235	0.585	0.074	0.024	0.293
192	TETRAMETHYLBENZENE	489	0.100	0.072	0.046	0.117
193	2,4,6-TRIMETHYLPHENOL	3	0.036	0.000	0.000	0.108
194	PENTYLBENZENE	253	0.184	0.094	0.045	0.185
195	TRIMETHYL-PENTANE	200	2.005	0.425	0.213	1.026
197	DECAMETHYLCYCLO-PENTASIL-OXANE	1	0.030			
199	1,3-DICHLOROBENZENE	646	0.889	0.030	0.000	0.200
200	HEXADECANE	20	0.034	0.000	0.000	0.000
201	2-METHYLTHIOPHENE	3	0.008	0.000	0.000	0.025
204	3,3-DIMETHYLPENTANE	412	0.1398	0.056	0.031	0.107
205	3-METHYL-1-BUTENE	567	0.298	0.124	0.066	0.212
206	2-METHYL-1-BUTENE	539	0.692	0.470	0.262	0.794
207	2,2,3-TRIMETHYL-PENTANE	119	0.256	0.075	0.000	0.354
208	2,3-DIMETHYLPENTANE	406	1.797	0.487	0.141	1.071
209	2,3,4-TRIMETHYL-PENTANE	691	0.337	0.228	0.104	0.411
210	2,6-DIMETHYLPHENOL	3	0.027	0.000	0.000	0.080
211	1,2,3-TRIMETHYL-BENZENE	677	1.605	0.317	0.057	0.647
212	2,3-DIMETHYLPYRIDINE	3	0.228	0.000	0.000	0.684
213	2,3-DIMETHYLHEXANE	177	0.108	0.000	0.000	0.000
214	3-CHLOROBENZALDEHYDE	1	0.058			
215	3-METHYLHEXANE	814	1.736	0.785	0.414	1.377
216	2,4-DIMETHYLHEXANE	757	0.310	0.184	0.090	0.319
217	3-METHYLHEPTANE	582	0.431	0.288	0.188	0.476
218	(Z)-2-BUTENE	817	0.510	0.295	0.065	0.600
219	2-METHYLHEXANE	797	1.415	0.951	0.484	1.605

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
220	2,5-DIMETHYLHEXANE	193	0.095	0.036	0.015	0.072
221	2-METHYLHEPTANE	759	0.383	0.264	0.125	0.445
222	1-HEXENE	154	0.135	0.000	0.000	0.000
223	OCTADECANE	145	0.118	0.006	0.006	0.022
224	DIBROMODICHLOR-METHANE	1	0.002			
225	PENTACHLOROBENZENE					
226	ETHYL-METHYL-BENZENE	786	0.428	0.293	0.167	0.482
227	(E)-3-METHYL-2-PENTENE	492	0.152	0.113	0.067	0.180
229	3-METHYLTHIOPHENE	3	0.008	0.000	0.000	0.025
230	3-ETHYLHEXANE	128	0.091	0.000	0.000	0.084
231	ETHYL-3-METHYLBENZENE	699	0.611	0.452	0.239	0.792
232	ETHYL-4-METHYLBENZENE	1268	1.074	0.463	0.246	0.956
233	(E)-2-BUTENE	791	0.844	0.525	0.270	0.945
235	2-METHYL-2-PENTENE	545	0.226	0.162	0.083	0.282
236	(Z)-2-PENTENE	689	0.664	0.432	0.148	0.872
237	CHLORO-METHOXYETHANE	5	0.000	0.000	0.000	0.000
238	TRIDECANE	21	0.086	0.000	0.000	0.000
239	TETRADECANE	21	0.107	0.000	0.000	0.000
240	PENTADECANE	21	0.039	0.000	0.000	0.000
241	HEPTADECANE	7	0.075	0.020	0.000	0.120
242	TETRACHLOROETHANE	308	0.022	0.000	0.000	0.003
244	(E)-2-PENTENE	710	0.756	0.436	0.200	0.806
245	(E)-4-METHYL-2-PENTENE	338	0.155	0.131	0.067	0.188
246	(Z)-4-METHYL-2-PENTENE	497	0.097	0.032	0.000	0.062
247	1-METHYLCYCLOPENTENE	50	0.006	0.000	0.000	0.000
248	2-METHYL-1-PENTENE	50	0.034	0.000	0.000	0.030
249	2-METHYLNONANE	1	1.375			
251	ETHYL-DIMETHYLBENZENE	454	0.357	0.236	0.138	0.372
252	ETHYL-DIMETHYLBENZENE	429	0.118	0.075	0.049	0.130
253	ETHYL-DIMETHYL PENTANE	1	0.762			
254	HEXYLBENZENE	94	0.016	0.010	0.006	0.017
255	UNDECANE	529	0.745	0.188	0.000	0.618

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
258	METHYLBENZALDEHYDE	2	0.069	0.069	0.006	0.132
260	ETHYLCYCLOPENTANE	117	0.554	0.429	0.143	0.757
261	ETHYLCYCLOHEXANE	649	0.086	0.036	0.011	0.084
262	DIMETHYL CYCLO-PENTANE	7	6.157	5.900	4.271	8.029
263	ETHYLTRIMETHYL-PLUMBANE	2	0.000	0.000	0.000	0.000
264	DIETHYLDIMETHYL-PLUMBANE	2	0.000	0.000	0.000	0.000
265	TRIETHYLMETHYLPLUMBANE	2	0.000	0.000	0.000	0.000
267	METHYLBUTYL-BENZENE	49	0.165	0.063	0.038	0.109
268	2,4-DIMETHYLHEPTANE	173	0.105	0.069	0.042	0.127
269	2,5-DIMETHYLHEPTANE	473	0.084	0.051	0.030	0.090
270	3-METHYLOCTANE	502	0.196	0.142	0.091	0.229
271	4-METHYLOCTANE	445	0.267	0.176	0.103	0.311
272	PAN	481	1.441	0.600	0.215	1.403
273	DIMETHYL CYCLO-PENTANE	20	1.965	1.143	0.000	2.614
275	TRIMETHYLHEXANE	50	0.038	0.000	0.000	0.022
276	BROMO-CHLORO-PROPENE	5	0.000	0.000	0.000	0.000
277	(E)-2-HEXENE	127	0.010	0.000	0.000	0.000
278	4-METHYL-2-PENTENE	7	0.193	0.000	0.000	0.583
280	NITRO-OXOPROPYL-PEROXIDE	132	0.110	0.043	0.014	0.119
281	METHYL-METHYLETHENYL-CYCLOHEXENE	81	0.001	0.000	0.000	0.000
282	METHYL-METHYLETHENYL-CYCLOHEXENE	61	0.035	0.024	0.010	0.054
283	(Z)-2-HEPTENE	346	0.056	0.037	0.026	0.060
284	(Z)-2-OCTENE	348	0.047	0.028	0.020	0.046
285	(Z)-3-HEXENE	13	0.987	0.000	0.000	1.517
286	(Z)-2-HEXENE	175	0.023	0.000	0.000	0.000
287	DICHLORO-PROPENE	148	23.394	23.900	7.500	35.450
289	TRICHLOROBENZENE	144	0.016	0.001	0.000	0.012
290	(E)-3-HEXENE	13	0.740	0.033	0.000	1.167

Table V-1. Daily Ambient Concentrations For All Chemicals (Data Base VOC-AMBI) for All Ambient Site Types (Contd.)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Upper
291	TRIMETHYLBICYCLO-HEPTENE	207	3.055	0.076	0.026	0.163
292	(E)-2-HEPTENE	343	0.060	0.036	0.019	0.071
293	4-METHYLNONANE	45	0.247	0.164	0.077	0.267
294	TETRACHLOROBENZENE	3	0.270	0.095	0.022	0.694
295	BUTENE	177	1.470	0.405	0.046	1.089
296	CHLORONITROBENZENE	1	0.028			
297	DICHLOROBENZENE	1	0.110			
298	DICHLOROETHENE	61	0.035	0.000	0.000	0.000
299	TETRAMETHYL BENZENE					
300	BROMOPROPANE	17	0.003	0.000	0.000	0.001
301	DICHLORO-1-PROPENE	6	0.125	0.004	0.000	0.171
302	CHLOROBENZENEAMINE	8	0.001	0.000	0.000	0.000
303	DIMETHYLCYCLOHEXANE	50	0.088	0.000	0.000	0.125
304	DICHLORONITROBENZENE	1	0.116			
305	DICHLORONAPHTHALENE	9	0.023	0.001	0.000	0.002
306	DIMETHYLCYCLOPENTANE	107	0.926	0.000	0.000	0.643
307	BROMOMETHYLBENZENE	4	0.106	0.018	0.017	0.195
310	DICHLOROMETHYL-BENZENE	1	0.010			
311	BENZENEDICARBOXAL-DEHYDE	1	0.023			
315	BENZOYL NITRO PEROXIDE	6	0.143	0.090	0.040	0.190
316	BROMOCHLOROPROPANE	2	0.003	0.003	0.000	0.005
317	DIBROMO-CHLORO-PROPANE	1	0.000			
318	PENTACHLORO-BUTADIENE	4	0.047	0.000	0.000	0.094
319	DIBROMOCHLOROPROPANE	486	0.001	0.000	0.000	0.000
320	BROMOPENTACHLORO ETHANE	4	0.023	0.000	0.000	0.046

Table V-2. Daily Indoor Concentrations For All Chemicals (Data Base VOC-INDO) for All Site Types[1]

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
3	CUMENE	103	0.177	0.000	0.000	0.179
5	FORMALDEHYDE	315	49.400	42.000	19.000	72.000
7	CARBON TETRACHLORIDE	2120	0.400	0.000	0.000	0.134
13	ACETONE	4	7.955	8.570	4.510	11.400
14	CHLOROFORM	2120	0.832	0.104	0.000	0.691
16	BENZENE	2128	5.162	3.135	1.034	6.583
17	TRICHLOROETHANE	2120	48.900	1.835	0.546	5.505
37	BROMOFORM	2120	0.000	0.000	0.000	0.000
38	BROMODICHLOROMETHANE	2120	0.008	0.000	0.000	0.000
41	1,1-DICHLOROETHENE	2120	19.665	0.000	0.000	0.000
54	DICHLOROTETRAFLUORO-ETHANE	2	0.025	0.250	0.020	0.030
62	METHYL ETHYL KETONE	4	9.238	7.160	4.150	14.325
64	TRICHLOROETHENE	2132	1.347	0.125	0.000	0.838
66	TETRACHLOROETHANE	585	0.014	0.000	0.000	0.000
69	A-PINENE	623	0.547	0.233	0.049	0.557
75	METHYLNAPHTHALENE	102	0.252	0.000	0.000	0.300
77	DIMETHYLBENZENE	2216	2.844	1.106	0.461	2.143
80	DICHLOROBENZENE	2121	0.073	0.000	0.000	0.000
81	TRIMETHYLBENZENE	96	0.574	0.285	0.120	0.805
92	ETHYLBENZENE	2278	2.887	1.106	0.461	2.218
93	ETHENYLBENZENE	2125	1.413	0.305	0.000	0.657
96	BENZALDEHYDE	106	1.578	0.000	0.000	1.300
97	PROPYLBENZENE	1	0.130			
101	DIMETHYLBENZENE	2305	8.666	3.111	1.475	5.760
104	DICHLOROBENZENE	2121	3.988	0.283	0.053	0.932
106	DIBROMOETHANE	585	0.001	0.000	0.000	0.000
114	1,2-DICHLOROETHANE	2120	0.095	0.000	0.000	0.000
118	TETRADECAMETHYL-CYCLOHEPTASILOXANE	3	0.403	0.350	0.350	0.510
123	1,3-DIMETHYLBENZENE	103	8.888	3.600	1.100	8.800
127	TRIMETHYLBENZENE	178	0.914	0.290	0.000	1.100
132	METHYLCYCLOHEXANE	10	0.799	0.747	0.498	0.996

NOTES:

1. Indoor data base includes a few ambient data included in indoor references as part of the study.

Table V-2. Daily Indoor Concentrations For All Chemicals (Data Base VOC-INDO) for All Site Types[1] (Continued)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
133	TOLUENE	2331	0.697	0.000	0.000	0.000
135	CHLOROBENZENE	2126	0.041	0.000	0.000	0.000
140	PENTANE	4	1.123	0.870	0.440	1.805
146	HEXANE	3	0 567	0.560	0.000	1.140
148	CYCLOHEXANE	4	1.380	0.727	0.436	2.325
152	OCTANE	605	0.882	0.514	0.236	0.921
154	2-BUTOXYETHANOL	14	0.214	0.075	0.030	0.360
155	NONANE	134	1.164	0.700	0.070	1.200
156	DODECANE	706	0.482	0.136	0.000	0.330
167	1,4-(DIOXANE)	585	1.029	0.000	0.000	0.092
170	DECANE	710	0.775	0.280	0.086	0.700
171	DIBROMOCHLOROMETHANE	2120	0.000	0.000	0.000	0.000
173	TETRACHLOROETHENE	2195	3.056	0.737	0.251	1.622
180	HEPTANE	4	1.281	1.220	1.098	1.464
181	TRIMETHYL-PENTANEDIOL	3	1.500	1.540	1.290	1.670
196	DODECAMETHYLCYCLO-HEXASIL-OXANE	5	0.460	0.490	0.020	0.860
197	DECAMETHYLCYCLO-PENTASIL-OXANE	25	0.206	0.090	0.050	0.240
198	HEXAMETHYLCYCLOTRI-SILOXANE	1	0.090			
199	1,3-DICHLOROBENZENE	2121	3.988	0.283	0.053	0.932
200	HEXADECANE	107	0.339	0.050	0.000	0.600
202	OCTAMETHYLCYCLO-TETRASIL-OXANE	12	0.689	0.265	0.065	1.375
203	HEXADECAMETHYLCYCLO-OCTASIL-OXANE	1	1.570			
215	3-METHYLHEXANE	7	1.586	1.464	0.330	2.928
219	2-METHYLHEXANE	2	2.684	2.684	2.196	3.172
238	TRIDECANE	122	1.484	0.490	0.000	1.500
239	TETRADECANE	119	0.803	0.600	0.170	0.930

NOTES:
1. Indoor data base includes a few ambient data included in indoor references as part of the study.

Table V-2. Daily Indoor Concentrations For All Chemicals (Data Base VOC-INDO) for All Site Types[1] (Continued)

Chemical Number	Chemical Name	Number of Data Points	Daily Concentrates in PPBV			
			Average	Median	Quartiles Lower	Quartiles Upper
240	PENTADECANE	112	0.227	0.200	0.000	0.400
241	HEPTADECANE	10	0.191	0.190	0.020	0.310
242	TETRACHLOROETHANE	585	0.003	0.000	0.000	0.000
249	2-METHYLNONANE	4	4.425	1.461	1.375	7.476
253	ETHYL-DIMETHYL PENTANE	4	1.144	0.953	0.762	1.525
255	UNDECANE	706	0.746	0.282	0.100	0.600
259	METHYLCYCLOOCTANE	6	0.270	0.220	0.050	0.470
266	TRIMETHYLCYCLOHEXANE	1	0.060			
281	METHYL-METHYLETHENYL-CYCLOHEXENE	103	3.030	1.500	0.000	3.100
289	TRICHLOROBENZENE	2	0.065	0.065	0.050	0.080
297	DICHLOROBENZENE	3	0.900	0.110	0.090	2.500
299	TETRAMETHYL BENZENE	8	1.313	1.315	0.945	1.645
314	ETHYLMETHYLCYCLO-HEXANE	1	0.470			
319	DIBROMOCHLOROPROPANE	2120	0.017	0.000	0.000	0.000

NOTES:
1. Indoor data base includes a few ambient data included in indoor references as part of the study.

Table V-3 summarizes the median concentrations in ppbv and the number of observations by site types for each chemical. Blank values indicate that no data was included in the data base for that chemical for the site type.

Tables V-4 and V-5 list the bibliographical references from which ambient and indoor data for each chemical were obtained, respectively.

Information regarding chemical names, common names, formulae, molecular weight, number and conversion factor is included in the VOC_CHEM and VOC__LOC files of the data base.

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
1	MYRCENE				0.000 50				
2	DIPHENYL ETHER								
3	CUMENE				0.000 14		0.000 96		
4	BUTYNE			0.650 5	0.425 16				
5	FORMALDEHYDE		2.700 12	2.720 281	6.500 332	9.150 4	44.000 273	80.000 25	
6	DENA								
7	CARBON TETRACHLORIDE	0.124 1134	0.000 86	0.091 791	0.110 2754	0.125 144			0.000 1650
8	NITROSOMORPHOLINE								
9	ANILINE		0.000 1	45.000 2	0.000 1	1.313 1			
10	DIMETHYLNITROSAMINE		0.003 2	0.013 3	0.014 25	0.016 12			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
11	FORMIC ACID				4.000 29				
12	DIETHYL SULFATE								
13	ACETONE	3.854 2	1.149 2		2.080 3	0.308 10		10.200 3	
14	CHLOROFORM	0.020 15	0.000 82	0.010 739	0.060 2696	0.507 122			0.173 1650
15	HEXACHLOROETHANE	0.006 3	0.000 3	0.000 14	0.000 34	0.000 15			
16	BENZENE	0.160 221	0.467 246	1.800 960	1.812 3812	1.474 148	1.765 1	2.110 5	3.762 1650
17	TRICHLOROETHANE	0.132 1064	0.074 8	0.587 659	0.396 1118	0.380 133		1.200 3	2.454 1650
18	METHANE	1599 88	1419 5	1693 4	218182 73	1750 38			
19	BROMOMETHANE	0.008 5	0.049 2	0.080 105	0.569 246				
20	ETHANE	2.095 10	3.821 33	15.780 226	9.150 571	8.315 52			
21	ETHENE	0.405 6	0.262 32	10.163 226	11.130 501	3.051 48			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
22	ACETYLENE	0.600 7	0.376 32	3.875 225	6.900 549	2.347 55			
23	CHLOROMETHANE	0.713 5	0.923 2	0.641 599	0.810 100				
24	IODOMETHANE	0.003 9	0.007 3	0.007 82	0.002 73				
25	DIBROMOMETHANE					0.000 21			
26	BROMOCHLOROMETHANE								
27	PROPANE	0.439 10	1.076 36	10.480 225	5.733 541	6.483 54			
28	1-PROPYNE				0.000 50	0.000 26			
29	CHLOROETHANE			0.021 58	0.104 127	0.000 5			
30	VINYL CHLORIDE	0.000 3	0.000 45	0.000 88	0.000 500	0.179 65			
31	ACETONITRILE		0.048 2		0.000 1	0.000 1			
32	ACETALDEHYDE	3.115 2	0.000 13	2.050 8	1.550 140	1.669 12			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
33	METHYLENE CHLORIDE	0.052 7	0.054 1	0.604 136	0.840 590	0.568 64			
34	CARBON DISULFIDE		0.041 6		0.065 23				
35	THIOBISMETHANE	0.000 1			1.100 304	0.192 55			
36	ETHYLENEOXIDE								
37	BROMOFORM			0.000 470	0.000 7	0.000 19			0.000 1650
38	BROMODICHLORO-METHANE			0.000 471	0.000 8	0.000 16			0.000 1650
39	2-METHYLPROPANE	0.158 6	0.340 36	3.817 223	3.275 546	4.204 56			
40	1,1-DICHLOROETHANE		0.000 2	0.000 14	0.013 103	0.000 26			
41	1,1-DICHLOROETHENE		0.000 79	0.000 577	0.000 565	0.000 54			0.000 1650
42	PHOSGENE	0.015 5		0.024 2	0.032 3				
43	CHLORODIFLUORO-METHANE (CFC-22)	0.061 3	0.027 1	0.025 2	1.785 36				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
44	PROPYLENE OXIDE								
45	TRICHLOROFLUORO-METHANE (F-11)	0.193 1104	0.137 39	0.400 178	0.356 174	0.180 12			
46	DICHLORODIFLUORO-METHANE (F-12)	0.332 860	0.231 4	0.598 130	0.726 86				
47	TETRAFLUORO-METHANE	0.070 2		0.095 5		0.140 1			
48	TETRAMETHYL-PLUMBANE					0.004 2			
49	2,2-DIMETHYLBUTANE			0.272 201	0.228 336				
50	MONOMETHYLESTER-SULFURIC ACID				0.470 8				
51	DIMETHYL-BUTANONE		0.000 26	0.000 26	0.000 150	13.698 4			
52	PENTACHLOROETHANE		0.000 2	0.000 13	0.000 37	0.000 16			
53	TRICHLORO-TRIFLUORO-ETHANE (F-113)	0.021 7	0.023 3	0.316 67	0.133 107				
54	DICHLORO-TETRA-FLUOROETHANE (F-114)	0.011 4	0.012 1	0.030 93	0.030 73			0.030 1	

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types						
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
55	HEXACHLOROCYCLO-PENTADIENE	0.021 7	0.023 3	0.316 67	0.133 107				
56	DIMETHYL SULFATE				1.255 8				
57	TETRAETHYLPLUMBANE					0.001 2			
58	1,2-DIBROMOPROPANE					0.000 17			
59	2-METHYLBUTANE	0.250 6	0.440 36	7.604 224	8.100 545	8.616 54			
60	2-METHYL-1,3-BUTADIENE		2.423 32	0.332 209	0.300 378	6.980 3			
61	1,2-DICHLOROPROPANE			0.042 85	0.011 623	0.001 6			
62	METHYL ETHYL KETONE		0.000 42	0.000 47	0.000 181	0.894 10		7.650 3	
63	1,1,2-TRICHLORO ETHANE		0.000 80	0.000 154	0.000 626	0.002 26			
64	TRICHLOROETHENE	0.013 14	0.010 84	0.057 739	0.205 2056	0.090 124		0.050 11	0.184 1650
65	2,3-DIMETHYLBUTANE			0.572 219	0.600 521	0.666 20			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
66	TETRACHLOROETHANE		0.000 80	0.000 297	0.000 612	0.000 22			0.000 468
67	2-NITROPROPANE								
68	DIMETHYL-3-METHYLENE-BICYCLO-HEPTANE		0.045 45						
69	A-PINENE	0.035 6	0.030 182	0.147 326	0.120 491	0.035 7	2.240 1	0.050 23	0.323 468
70	TRICHLOROBENZENE								
71	HEXACHLORO-BUTADIENE				0.003 56	0.002 16			
72	METHYLNAPHTHALENE	0.000 1	0.000 1	0.000 1	0.000 10	0.000 51			
73	NAPHTHALENE	0.000 1	0.000 1	0.023	 5	0.3435 60			
74	QUINOLINE		0.000 1		0.000 1	0.189 1			
75	METHYLNAPHTHALENE		0.000 1		0.000 15	0.172 1	0.000 96		
76	PHENYL-PROPANONE				0.097 1	0.092 1			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
66	TETRACHLOROETHANE		0.000 80	0.000 297	0.000 612	0.000 22			0.000 468
67	2-NITROPROPANE								
68	DIMETHYL-3-METHYLENE-BICYCLO-HEPTANE		0.045 45						
69	A-PINENE	0.035 6	0.030 182	0.147 326	0.120 491	0.035 7	2.240 1	0.050 23	0.323 468
70	TRICHLOROBENZENE								
71	HEXACHLORO-BUTADIENE				0.003 56	0.002 16			
72	METHYLNAPHTHALENE	0.000 1	0.000 1	0.000 1	0.000 10	0.000 51			
73	NAPHTHALENE	0.000 1	0.000 1	0.023	 5	0.3435 60			
74	QUINOLINE		0.000 1		0.000 1	0.189 1			
75	METHYLNAPHTHALENE		0.000 1		0.000 15	0.172 1	0.000 96		
76	PHENYL-PROPANONE				0.097 1	0.092 1			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
77	DIMETHYLBENZENE	0.350 7	0.025 239	0.645 937	0.800 2297	1.198 98	2.045 1	0.370 72	1.331 1650
78	O-CRESOL	0.000 1	0.000 1		0.000 1	0.359 32			
79	CHLORO-METHYLBENZENE		0.010 19	0.010 44	0.050 246				
80	DICHLOROBENZENE	0.000 1	0.000 20	0.000 530	0.020 424	0.048 77	0.107 1		0.000 1650
81	TRIMETHYLBENZENE	0.439 4	0.211 3	0.775 325	1.000 639	1.289 27		0.360 74	
82	TETRAMETHYLBENZENE			0.036 25	0.011 43				
83	DIBROMO-3-CHLORO-PROPANE					0.000 3			
84	3-METHYLPENTANE	0.025 4	0.085 35	1.567 220	1.635 534	1.347 54			
85	3-PENTANONE		0.000 1		0.000 1	0.570 1			
86	METHYLCYCLOPENTANE	0.000 1	0.000 32	1.043 219	1.053 526	3.100 14			
87	(1-METHYLETHYL)-BENZENE	0.122 4	0.128 2	0.069 203	0.43 475	0.108 6			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
88	1-(METHYLETHENYL)-BENZENE			0.000 15	0.000 161				
89	1-PHENYLETHANONE	0.000 1			0.041 2	0.094 32			
90	NITROBENZENE	0.000 2	0.000 73	0.000 111	0.000 544	0.000 4			
91	METHYL-METHYLETHYL-BENZENE			0.464 53	0.398 67				
92	ETHYLBENZENE	0.156 6	0.013 122	0.622 886	0.616 1532	0.852 103	1.000 95	0.280 41	1.336 1650
93	ETHENYLBENZENE	0.000 1	0.080 21	0.066 571	0.200 447	0.317 83	0.676 1	2.090 4	0.399 1650
94	BENZYLCHLORIDE				0.009 42	0.001 1			
95	BENZONITRILE				0.010 4				
96	BENZALDEHYDE	0.000 1	0.000 1		0.000 44	0.100 51			
97	PROPYLBENZENE	0.056 3	0.056 2	0.123 213	0.167 520		0.000 95	1.800 3	
98	BUTYLBENZENE				0.000 98				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
99	1,4-DIETHYLBENZENE			0.250 71	0.000 250				
100	2,4-DIMETHYLPHENOL		0.000 1		0.000 1	0.200 1			
101	DIMETHYLBENZENE	0.158 8	0.046 234	1.781 947	1.653 2205	2.342 104	3.700 99	0.450 60	3.687 1650
102	CHLORO-METHYLBENZENE		0.010 19	0.120 45	0.100 246				
103	P-CRESOL								
104	DICHLOROBENZENE		0.000 20	0.048 545	0.050 369	0.000 13	1.293 1		0.416 1650
105	CHLOROMETHYL OXIRANE								
106	DIBROMOETHANE		0.000 75	0.000 318	0.000 1518	0.233 58			0.000 468
107	3-BROMO-1-PROPENE					0.000 17			
108	BUTANE	0.510 7	0.779 36	8.832 226	9.174 546	9.500 53			
109	1-BUTENE			0.000 20	0.000 42				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
110	1,3-BUTADIENE	0.000 4	0.100 2	0.320 196	0.290 385	1.000 22			
111	2-PROPENAL				7.000 46	0.257 3			
112	BROMO-CHLOROETHANE	0.000 1				0.025 25			
113	CHLORO-PROPENE								
114	1,2-DICHLOROETHANE	0.000 4	0.000 44	0.000 600	0.012 1214	0.255 182			0.000 1650
115	4-METHYL-2-PENTANONE								
116	PROPANENITRILE	0.000 4	0.000 44	0.000 600	0.012 1214	0.255 182			
117	2-PROPENENITRILE			0.070 23	0.120 13	0.853 34			
118	TETRADECAMETHYLCYCLO-HEPTASILOXANE							0.350 3	
119	2-METHYLPENTANE	0.017 7	0.061 37	2.385 224	2.197 535	2.414 48			
120	2-PENTANONE		0.000 1		0.000 1		0.142		

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
121	2,4-DIMETHYLPENTANE	0.000 4	0.271 3	0.224 217	0.342 534	0.586 24			
122	2,5-FURANDIONE								
123	1,3-DIMETHYLBENZENE	0.45. 8	0.0335 162	1.587 383	1.500 2470	2.554 103	3.700 96		
124	M-CRESOL	0.000 1		0.000 1	0.000 1				
125	2,4-DIMETHYLPYRIDINE		0.000 1		0.000 1	2.510 1			
126	2,6-DIMETHYLPYRIDINE		0.000 1		0.000 1	0.913 1			
127	TRIMETHYLBENZENE	0.422 5	0.173 4	0.227 111	0.200 380	0.131 85	0.300 95	0.360 59	
128	DIMETHYLPHENOL		0.000 1		0.000 1	0.200 1			
129	TRICHLORO-BENZENE				0.000 4				
130	TRIMETHYL-PYRIDINE		0.000 1		0.000 1	1.816 1			
131	BROMOBENZENE	0.000 1				0.031 25			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
132	METHYLCYCLOHEXANE	0.000 4	0.000 34	0.4855 220	0.414 465	1.450 14		0.747 7	
133	TOLUENE	0.049 225	0.350 248	0.195 958	2.883 2519	6.314 104	8.400 101	0.865 80	0.000 1650
134	4-METHYLPYRIDINE								
135	CHLOROBENZENE	0.000 1	0.035 80	0.000 647	0.220 675	0.009 88		0.020 3	0.000 1650
136	CYCLOHEXANONE								
137	PHENOL	0.000 1	0.000 1		0.015 2	6.883 44			
138	3-METHYLPYRIDINE								
139	2-METHYLPYRIDINE		0.000 1		0.000 1	1.838 1			
140	PENTANE	0.080 5	0.245 36	4.104 224	3.820 547	4.113 54		1.150 3	
141	1-PENTENE	0.000 4	0.080 2	0.266 219	0.270 451	0.000 42			
142	BROMO-CHLORO-PROPANE					0.002 6			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
143	1H-PYRROLE		0.000 1		0.000 1	0.364 1			
144	TETRAHYDROFURAN				0.283 3				
145	THIOPHENE								
146	HEXANE	0.009 4	0.046 42	1.858 225	1.690 547	1.418 56		0.850 2	
147	1,4-DICHLOROBUTANE				0.093 1	0.000 6			
148	CYCLOHEXANE	0.000 3	0.025 2	0.502 216	0.293 460	2.600 11		0.872 3	
149	CYLCOHEXENE			0.087 133	0.095 129				
150	PYRIDINE		0.000 1		0.000 1	4.019 1			
151	OXYBIS 2-CHLOROETHANE								
152	OCTANE		0.007 42	0.236 334	0.443 747	2.997 1		0.039 17	0.621 468
153	1-OCTENE			0.045 191	0.045 265				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
154	2-BUTOXYETHANOL							0.075 14	
155	NONANE	0.311 4	0.032 12	0.179 215	0.303 714	0.867 15	0.800 95	0.450 26	
156	DODECANE		0.000 30	0.000 131	0.200 364	2.297 1	0.400 95	0.640 15	0.158 468
157	PROPENE	0.117 4	0.014 36	2.553 227	2.365 552	1.167 54			
158	2-METHYL-1-PENTENE			0.000 20	0.000 42				
159	2-METHYL-1-PROPENE	0.138 4	0.313 2		0.600 125	0.654 39			
160	DIPHENYLMETHANONE								
161	ISOQUINOLINE		0.000 1		0.000 1	0.000 1			
162	TRICHLOROBENZENE			0.100 18					
163	DODECYLBENZENE								
164	PROPANAL	0.933 3	0.350 2		17.4 22	4.950 4			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
165	BUTANAL				1.700 28	1.700 3			
166	BUTYL ACETATE								
167	1,4-(DIOXANE)		0.000 26	0.000 184	0.000 407				0.000 468
168	1-NONENE			0.038 125	0.050 248				
169	OCTANAL								
170	DECANE	0.185 6	0.000 80	0.198 336	0.356 790	1.120 26	0.900 96	1.160 18	0.258 468
171	DIBROMOCHLOROMETHANE			0.000 471	0.000 23	0.000 16			0.000 1650
172	2-CHLORO-BUTADIENE				0.589 1	0.000 4			
173	TETRACHLOROETHENE	0.037 16	0.010 86	0.376 771	0.370 2251	0.067 98	0.879 1	0.095 56	0.900 1650
174	DIMETHYL-METHYLENE-BICYCLO-HEPTANE	0.000 3	0.046 99		0.000 52	0.048 7			
175	1,2-DIETHYLBENZENE	0.000 1		0.172 202	0.232 342	0.000 7			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
176	(1-METHYLPROPYL)-BENZENE			0.033 137	0.049 279				
177	ACETIC ACID ETHYL-ESTER				0.733 5				
178	1,3-DIETHYLBENZENE			0.067 165	0.051 379				
179	CYCLOPENTENE			0.000 15	0.000 161				
180	HEPTANE	0.000 4	0.011 44	0.596 217	0.964 764	1.900 15		1.220 3	
181	TRIMETHYL-PENTANEDIOL						1.540 3		
182	CIS-DICHLOROETHENE		0.000 2	0.000 13	0.050 124	0.000 22			
183	TRANS-DICHLOROETHENE		0.560 1			0.928 1			
184	CYCLOPENTANE			0.440 218	0.354 457	0.349 29			
185	CYCLOHEPTANE			0.067 60	0.054 92				
186	1,2-PROPADIENE				0.000 50				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types						
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
187	CARBON OXIDE SULFIDE		0.456 3		0.520 15				
188	2,2,3-TRIMETHYLBUTANE			0.228	50				
189	TETRAMETHYLBENZENE			0.025 161	0.033 272				
190	2,4,5-TRIMETHYLPHENOL		0.000 1		0.000 1	0.108 1			
191	2-METHYL-2-BUTENE	0.000 1		0.084 64	0.064 155	0.770 14			
192	TETRAMETHYLBENZENE			0.059 181	0.080 288				
193	2,4,6-TRIMETHYLPHENOL		0.000 1		0.000 1	0.108 1			
194	PENTYLBENZENE			0.064 97	0.118 155				
195	TRIMETHYL-PENTANE	0.000 4	0.163 2	0.200 15	0.500 165	1.301 14			
196	DODECAMETHYLCYCLO-HEXASILOXANE							0.490 5	
197	DECAMETHYLCYCLO-PENTASILOXANE				0.030 1			0.090 24	

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
198	HEXAMETHYLCYCLOTRI-SILOXANE								
199	1,3-DICHLOROBENZENE		0.007 2	0.052 485	0.006 129	0.000 30	0.247 1		0.416 1650
200	HEXADECANE		0.000 1		0.000 18	0.324 1	0.150 94	0.155 4	
201	2-METHYLTHIOPHENE		0.000 1		0.000 1	0.025 1			
202	OCTAMETHYLCYCLO-TETRASILOXANE							0.160 11	
203	HEXADECAMETHYLCYCLO-OCTASILOXANE							1.57 1	
204	3,3-DIMETHYLPENTANE	0.000 1		0.056 146	0.058 232	0.000 14			
205	3-METHYL-1-BUTENE		0.053 2	0.120 186	0.116 349	0.290 10			
206	2-METHYL-1-BUTENE	0.000 4	0.070 2	0.422 200	0.486 299	0.560 14			
207	2,2,3-TRIMETHYL-PENTANE				0.075 119				
208	2,3-DIMETHYLPENTANE	0.000 4	0.000 2	0.312 50	0.543 337	0.871 13			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
209	2,3,4-TRIMETHYL-PENTANE			0.223 217	0.226 454				
210	2,6-DIMETHYLPHENOL		0.000 1		0.000 1	0.080 1			
211	1,2,3-TRIMETHYL-BENZENE	0.000 1		0.378 194	0.267 439	0.845 24			
212	2,3-DIMETHYLPYRIDINE		0.000 1		0.000 1	0.684 1			
213	2,3-DIMETHYLHEXANE			0.000 15	0.000 162				
214	3-CHLOROBENZALDEHYDE				0.058 1				
215	3-METHYLHEXANE	0.000 4	0.033 34	0.704 217	0.880 526	0.329 13		1.464 5	
216	2,4-DIMETHYLHEXANE			0.178 216	0.181 521				
217	3-METHYLHEPTANE			0.247 203	0.316 359				
218	(Z)-2-BUTENE	0.100 4	0.225 2	0.349 222	0.275 528	0.000 41			
219	2-METHYLHEXANE	0.000 1	0.010 32	0.953 212	0.993 518	2.143 14		2.196 1	

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
220	2,5-DIMETHYLHEXANE			0.041 53	0.033 134				
221	2-METHYLHEPTANE			0.212 218	0.280 521				
222	1-HEXENE	0.000 3	0.009 2	0.000 15	0.000 120	0.000 14			
223	OCTADECANE				0.006 145				
224	DIBROMODICHLOR-METHANE					0.002 1			
225	PENTACHLOROBENZENE								
226	ETHYL-METHYL-BENZENE	0.222 4	0.100 2	0.242 219	0.311 527	0.795 14			
227	(E)-3-METHYL-2-PENTENE			0.112 183	0.110 289				
228	3-METHYL-1H-PYRROLE								
229	3-METHYLTHIOPHENE		0.000 1		0.000 1	0.025 1			
230	3-ETHYLHEXANE			0.000 15	0.000 113				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
231	ETHYL-3-METHYL-BENZENE	0.200 3	0.239 2	0.437 220	0.461 454				
232	ETHYL-4-METHYL-BENZENE	0.334 2		0.340 322	0.516 855	0.344 69			
233	(E)-2-BUTENE	0.000 1	0.250 1	0.499 210	0.549 518	0.113 42			
234	DIMETHYLDISULFIDE								
235	2-METHYL-2-PENTENE			0.160 190	0.155 335				
236	(Z)-2-PENTENE	0.020 4	0.000 2	0.490 204	0.401 450	1.400 13			
237	CHLORO-METHOXYETHANE					0.000 5			
238	TRIDECANE		0.000 1		0.000 19	1.459 1	0.600 95	0.505 16	
239	TETRADECANE		0.000 1		0.000 19	1.602 1	0.600 95	0.920 13	
240	PENTADECANE		0.000 1		0.000 19	0.691 1	0.200 94	0.480 7	
241	HEPTADECANE		0.000 1		0.020 5	0.305 1		0.310 6	

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
242	TETRACHLOROETHANE		0.000 2	0.000 157	0.000 134	0.000 15			0.000 468
243	2-METHYL-1H-PYRROLE								
244	(E)-2-PENTENE	0.000 4	0.000 3	0.422 212	0.416 457	1.920 15			
245	(E)-4-METHYL-2 -PENTENE			0.171 90	0.108 229				
246	(Z)-4-METHYL-2 -PENTENE			0.043 116	0.023 361				
247	1-METHYLCYCLOPENTENE				0.000 50				
248	2-METHYL-1-PENTENE				0.000 50				
249	2-METHYLNONANE				1.375 1			1.547 3	
250	ISOCYANOBENZENE								
251	ETHYL-DIMETHYLBENZENE			0.183 171	0.277 267				
252	ETHYL-DIMETHYLBENZENE			0.061 157	0.082 252				

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
253	ETHYL-DIMETHYL PENTANE							1.144 3	
254	HEXYLBENZENE			0.010 24	0.009 68				
255	UNDECANE	0.145 1	0.000 30	0.072 133	0.327 363	1.953 2	0.700 97	1.010 14	0.282 468
256	DICHLOROTETRA-FLUOROETHANE								
257	METHYLPYRIDINE								
258	METHYLBENZALDEHYDE				0.132 1	0.006 1			
259	METHYLCYCLOOCTANE							0.220 6	
260	ETHYLCYCLOPENTANE				0.429 117				
261	ETHYLCYCLOHEXANE			0.050 197	0.028 432				
262	DIMETHYL CYCLO-PENTANE				8.029 3	4.629 4			
263	ETHYLTRIMETHYL-PLUMBANE				0.762 1	0.000 2			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types						
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
264	DIETHYLDIMETHYL-PLUMBANE					0.000 2			
265	TRIETHYLMETHYLPLUMBANE					0.000 2			
266	TRIMETHYLCYCLOHEXANE							0.060 1	
267	METHYLBUTYL-BENZENE			0.064 17	0.062 27				
268	2,4-DIMETHYLHEPTANE			0.069 61	0.067 106				
269	2,5-DIMETHYLHEPTANE			0.048 177	0.053 277				
270	3-METHYLOCTANE			0.129 193	0.143 289				
271	4-METHYLOCTANE			0.147 168	0.198 257				
272	PAN	0.111 3	0.253 1	0.543 296	0.802 181				
273	DIMETHYL CYCLO-PENTANE	0.000 1			1.786 5	1.143 14			
274	2-PROPOXY ETHANOL								

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
275	TRIMETHYLHEXANE				0.000 50				
276	BROMO-CHLORO-PROPENE					0.000 5			
277	(E)-2-HEXENE			0.000 15	0.000 112				
278	4-METHYL-2-PENTENE	0.000 3	0.000 2		0.384 2				
279	DICHLOROMETHOXY-METHANE								
280	NITRO-OXOPROPYL-PEROXIDE	0.047 2		0.056 57	0.033 73				
281	METHYL-METHYL-ETHENYL-CYCLOHEXENE	0.000 3	0.009 5		0.000 66	0.000 7	1.800 96		
282	METHYL-METHYLETHENYL-CYCLOHEXENE		0.024 61						
283	(Z)-2-HEPTENE			0.039 111	0.036 215				
284	(Z)-2-OCTENE			0.031 133	0.028 197				
285	(Z)-3-HEXENE				0.000 6	0.000 7			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types						
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace / Personal
286	(Z)-2-HEXENE			0.000 15	0.000 160			
287	DICHLORO-PROPENE				23.900 148			
288	DICHLORO-PROPENE							
289	TRICHLOROBENZENE		0.000 2	0.000 14	0.002 103	0.000 25		0.050 1
290	(E)-3-HEXENE	0.000 3	0.025 2		0.933 5	1.167 3		
291	TRIMETHYLBICYCLO-HEPTENE		0.047 65	0.136 51	0.096 67	0.020 7		
292	(E)-2-HEPTENE			0.037 110	0.036 215			
293	4-METHYLNONANE			0.133 22	0.183 22			
294	TETRACHLOROBENZENE	0.022 1			0.694 1	0.095 1		
295	BUTENE		3.150 1	1.125 1	0.375 135	0.436 40		
296	CHLORONITROBENZENE							

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
297	DICHLOROBENZENE							1.295 2	
298	DICHLOROETHENE			0.000 15	0.000 46				
299	TETRAMETHYL BENZENE							1.315 8	
300	BROMOPROPANE					0.000 17			
301	DICHLORO-1-PROPENE	0.000 1				0.007 5			
302	CHLOROBENZENEAMINE			0.000 1	0.000 5	0.003 2			
303	DIMETHYLCYCLOHEXANE				0.000 50				
304	DICHLORONITROBENZENE								
305	DICHLORONAPHTHALENE					0.001 9			
306	DIMETHYLCYCLOPENTANE			0.000 15	0.000 92				
307	BROMOMETHYLBENZENE			0.370 1		0.017 3			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
308	ETHYL DIMETHYL BENZENE								
309	TETRACHLOROMETHYL-BENZENE								
310	DICHLOROMETHYL-BENZENE					0.010 1			
311	BENZENEDICARBOXAL-DEHYDE				0.023 1				
312	TRIMETHYLCYCLOHEXANE								
313	TRICHLOROMETHYL-BENZENE								
314	ETHYLMETHYLCYCLO-HEXANE							0.470 1	
315	BENZOYL NITRO PEROXIDE				0.090 6				
316	BROMOCHLOROPROPANE					0.003 2			
317	DIBROMO-CHLORO-PROPANE								
318	PENTACHLORO-BUTADIENE				0.000 4	0.000 1			

Table V-3. Daily Median Concentrations and Number of Samples by Site Types for all Chemicals

Chemical Number	Chemical Name	Median Concentrations in PPBV and Number of Samples by Site Types							
		Remote	Rural	Suburban	Urban	Source Dominated	Indoor	Workplace	Personal
319	DIBROMOCHLOROPROPANE			0.000 470		0.000 16		0.000 1650	
320	BROMOPENTACHLORO ETHANE				0.000 4				

Table V-4. Contributing References to Ambient Data Base by Chemical

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
1	MYRCENE	300
3	CUMENE	299
4	BUTYNE	252
5	FORMALDEHYDE	28,106,108,179,222,242,243,246,249,253,263, 265, 267,273,277,286,292,294,303
7	CARBON TETRACHLORIDE	13,20,21,120,122,169,170,173,174,175,196,204, 205, 206,227,229,232,235,236,238,239,253,254,255, 256,257,258,274,275,279,284,285,287,295,296, 298, 301, 302,305,307,308,309,310,311,313
9	ANILINE	27,284,291
10	DIMETHYLNITROSAMINE	59,62,167,169,185
11	FORMIC ACID	303
13	ACETONE	10,175,191,238,239,283,291
14	CHLOROFORM	20,21,122,169,170,173,174,175,204,205,206,229, 232, 233,238,239,253,254,256,257,274,275,279,284, 295,296,298,302,305,307,308,309,310,311
15	HEXACHLOROETHANE	175,205,239
16	BENZENE	10,20,21,39,55,96,144,161,169,170,173,175, 188,206,227,229,233,235,237,238,239,247,251, 252,253,254, 255,256,257,258,263,275,276,277,278,279,281, 283, 284,290,291,295,296,298,300,304,307,308,309, 310, 311,312
17	TRICHLOROETHANE	13,20,120,122,169,170,173,174,175,196,204, 205,206,229,232,233,235,236,238,239,245,253, 255,256,257, 258,274,279,283,284,295,296,301,302,305,307, 308, 309,310,311,313
18	METHANE	109,126,127,191,195,204,205,235,259,271,285, 290, 300,305,306
19	BROMOMETHANE	204,205,206,229,253,258,261,279,302
20	ETHANE	108,126,127,144,191,205,237,247,252,256,259, 276, 278,281,285,290,300,303
21	ETHENE	108,109,125,126,127,144,191,195,205,247,252, 256, 259,276,281,285,300,303
22	ACETYLENE	108,109,125,126,127,144,191,195,205,237,247, 252, 256,259,276,278,281,285,300
23	CHLOROMETHANE	204,205,206,229,253,258,261,279,284
24	IODOMETHANE	120,122,204,205,229,253,279,305
25	DIBROMOMETHANE	72,172,238

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
27	PROPANE	108,126,127,144,191,205,237,247,252,256, 259,276, 278,281,285,300
28	1-PROPYNE	285,300
29	CHLOROETHANE	175,229,253,258,279,302,312
30	VINYL CHLORIDE	20,21,71,122,169,170,175,238,239,256,279, 284,295, 302,307
31	ACETONITRILE	290,291
32	ACETALDEHYDE	10,170,191,238,242,243,246,249,253
33	METHYLENE CHLORIDE	169,170,174,175,205,206,229,238,239,253, 254,255, 258,279,284,295,307
34	CARBON DISULFIDE	140,248
35	THIOBISMETHANE	144,173,206,229
37	BROMOFORM	172,174,236,296,308,309,310,311
38	BROMODICHLOROMETHANE	172,174,233,296,302,308,309,310,311
39	2-METHYLPROPANE	108,126,127,144,191,195,205,237,247,252 256, 259, 276,278,281,285,300
40	1,1-DICHLOROETHANE	170,175,199,229,233,239,279
41	1,1-DICHLOROETHENE	21,74,170,174,175,229,233,239,254,255,284, 296,302,307,308,309,310,311
42	PHOSGENE	204,205
43	CHLORODIFLUOROMETHANE	188,204,205,305
45	TRICHOLORFLUOROMETHANE (F-11)	120,122,196,204,205,206,229,231,232,235, 253,256,258,272,274,279,285,287,301,305,313
46	DICHLORODIFLUOROMETHANE (F-12)	122,204,205,229,231,232,243,253,258,279, 287,301, 305
47	TETRAFLUOROMETHANE	241
48	TETRAMETHYLPLUMBANE	184
49	2,2-DIMETHYLBUTANE	252,300
50	MONOMETHYLESTER SULFURIC -ACID	289
51	3,3-DIMETHYL-2-BUTANONE	21,170,238,284
52	PENTACHLOROETHANE	175,239,296
53	TRICHLORO-TRIFLUORO- ETHANE (F-113)	122,204,205,206,229,253,279,305
54	DICHLOROTETRAFLUOROETHANE	204,205,229,253,262,279
55	1,2,3,4,5,5-HEXA- CHLOROCYCLOPENTA- DIENE	284
56	DIMETHYL SULFATE	289
57	TETRAETHYLPLUMBANE	184
58	1,2-DIBROMOPROPANE	172,175
59	2-METHYLBUTANE	108,126,127,144,191,195,205,237,247,252, 256,259,276,278,281,285,300
60	2-METHYL-1,3-BUTADIENE	247,252,256,259,300
61	1,2-DICHLOROPROPANE	170,175,229,233,253,275,279,296,298
62	METHYL ETHYL KETONE	1,170,239,242,243,283,284,291

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
63	1,1,2-TRICHLOROETHANE	21,170,175,206,229,236,238,239,253,254, 279,284,296,302
64	TRICHLOROETHENE	13,20,21,122,169,170,173,174,175,204,205, 206,229,232,233,236,238,239,253,254,255, 256,257,263,274,275,279,284,295,296,298, 302,307,308, 309,310,311
65	2,3-DIMETHYLBUTANE	252,256,276,278,300
66	TETRACHLOROETHANE	21,170,175,206,229,236,239,253,254,279,284, 296,302,311
68	DIMETHYL-3-METHYLENE-BICYCLO-HEPTANE	290,297
69	TRIMETHYL-BICYCLO-HEPT-2-ENE	10,39,126,191,244,247,251,252,262,281,290, 297,300,311
71	HEXACHLORO-BUTADIENE	118,175,229,236,279,296
72	1-METHYLNAPHTHALENE	169,170,173,188,236,291
73	NAPHTHALENE	173,188,235,236,291
74	QUINOLINE	291
75	2-METHYLNAPHTHALENE	291,299
76	1-PHENYL-1-PROPANONE	173,188
77	1,2-DIMETHYLBENZENE	10,21,39,109,126,127,144,161,173,188,191,206, 229,235,237,247,251,252,253,254,255,256, 257,258,259,262,275,276,278,279,283,284, 290,291, 298,300,308,309,310,311
78	O-CRESOL	173,291
79	1-CHLORO-2-METHYLBENZENE	254,284
80	1,2-DICHLOROBENZENE	20,173,174,175,206,227,229,233,236,239, 251,254,284,308,309,310,311
81	1,2,4-TRIMETHYLBENZENE	126,127,191,206,229,237,252,253,256,258, 259,262,276,278,279,300
82	TETRAMETHYLBENZENE	252
83	DIBROMO-3-CHLOROPROPANE	174
84	3-METHYLPENTANE	126,127,191,237,247,252,256,259,276,278, 285,300
85	3-PENTANONE	291
86	METHYLCYCLOPENTANE	247,252,256,259,276,278,300
87	(1-METHYLETHYL)-BENZENE	126,252,255,256,259,278,300
88	1-(METHYLETHENYL)-BENZENE	256,278,300
89	1-PHENYLETHANONE	173,236,239
90	NITROBENZENE	20,21,169,170,239,254,284
91	METHYL-METHYLETHYL-BENZENE	252,255
92	ETHYLBENZENE	126,127,161,173,191,206,229,236,237,247, 252,253,254,255,256,258,259,262,275,276, 278,279,283,284,290,291,298,299,300,308, 309,310,311

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Name	References Contributing to Ambient Data Base
93	ETHENYLBENZENE	75,172,173,235,251,254,255,256,258,278,284, 300,308,309,310,311
94	(CHLOROMETHYL)-BENZENE	175,229
95	BENZONITRILE	188,236
96	BENZALDEHYDE	170,173,238,239,242,243,283,291,299
97	PROPYLBENZENE	126,252,256,276,278,300
98	BUTYLBENZENE	255,300
99	1,4-DIETHYLBENZENE	252,256,278,300
100	2,4-DIMETHYLPHENOL	291
101	1,4-DIMETHYLBENZENE	10,21,39,126,127,144,161,173,188,191,206, 229,235,237,247,251,252,253,254,255,256, 257,258,259,262,275,276,278,279,283,284, 290,291,298, 299,300,308,309,310,311
102	CHLORO-METHYLBENZENE	254,284
104	1,4-DICHLOROBENZENE	20,175,239,251,254,258,284,302,308,309, 310, 311
106	1,2-DIBROMOETHANE	21,73,169,170,172,173,174,175,205,206,229, 233,239,253,254,257,279,284,295,296,311
107	3-BROMO-1-PROPENE	172,174
108	BUTANE	108,126,127,144,191,195,205,237,247,252, 256,259,276,278,281,285,300
109	1-BUTENE	108,256
110	1,3-BUTADIENE	126,127,188,252,259,300
111	2-PROPENAL	6,170,242
112	1-BROMO-2-CHLOROETHANE	170,172,173,174,238
114	1,2-DICHLOROETHANE	20,21,41,169,170,173,174,175,206,229,233, 236,238,239,253,275,279,284,295,296,298, 307,308, 309,310,311
116	PROPANENITRILE	126
117	2-PROPENENITRILE	75,284
119	2-METHYLPENTANE	108,126,127,191,237,247,252,256,259,276, 278,285,300
120	2-PENTANONE	291
121	2,4-DIMETHYLPENTANE	126,127,191,252,256,259,276,278,300
123	1,3-DIMETHYLBENZENE	10,21,39,126,127,144,161,173,188,191,206, 229,235,237,247,252,253,254,255,256,257, 258,259,275,276,278,279,284,290,298,299,300
124	M-CRESOL	291
125	2,4-DIMETHYLPYRIDINE	291
126	2,6-DIMETHYLPYRIDINE	291

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
127	1,3,5-TRIMETHYLBENZENE	126,127,173,191,206,229,253,255,256,258, 259,262,276,278,279,291,299,300
128	3,5-DIMETHYLPHENOL	291
129	1,3,5-TRICHLOROBENZENE	296
130	2,4,6-TRIMETHYLPYRIDINE	291
131	BROMOBENZENE	170,172,173,174
132	METHYLCYCLOHEXANE	126,247,252,256,259,263,278,283,300
133	METHYLBENZENE	10,21,39,96,108,125,126,127,144,161,173, 188,191,206,229,235,236,237,238,247,251, 252,253,254,255,256,257,258,259,262,263, 275,276,278,279,281,283,284,290,291,295, 298,299,300,304, 308,309,310,311,312
135	CHLOROBENZENE	20,21,169,170,173,174,175,206,227,229,233, 236,238,239,254,255,256,258,262,279,284, 296,302,308,309,310,311,312
137	PHENOL	173,188,230,238,291
139	2-METHYLPYRIDINE	291
140	PENTANE	108,126,127,144,191,195,205,237,247,252, 256,259,276,278,281,283,285,300
141	1-PENTENE	108,126,252,256,259,278,285,300
142	1-BROMO-3-CHLOROPROPANE	172,174
143	1H-PYRROLE	291
144	TETRAHYDROFURAN	255
146	HEXANE	108,126,127,144,191,195,237,247,252,256, 259,276,278,283,285,290,300
147	1,4-DICHLOROBUTANE	175
148	CYCLOHEXANE	126,252,256,259,263,278,300
149	CYLCOHEXENE	252
150	PYRIDINE	291
152	OCTANE	144,247,252,256,262,276,278,290,291,300, 311
153	1-OCTENE	252
155	NONANE	126,144,252,256,259,262,263,278,290,291, 299,300
156	DODECANE	39,144,188,262,291,299,300,311
157	PROPENE	108,109,125,126,127,144,191,195,205,237, 247,252,256,259,276,278,285,300
158	2-METHYL-1-PENTENE	108,256
159	2-METHYL-1-PROPENE	126,259,278,285,300
161	ISOQUINOLINE	291
162	1,2,4-TRICHLOROBENZENE	258
164	PROPANAL	126,243
165	BUTANAL	242,243

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
167	1,4-(DIOXANE)	21,254,284,311
168	1-NONENE	252
170	DECANE	10,39,126,127,144,188,191,252,259,262, 283,291,299,300,311
171	DIBROMOCHLOROMETHANE	172,233,236,296,302,308,309,310,311
172	2-CHLORO-1,3-BUTADIENE	175
173	TETRACHLOROETHENE	13,20,21,120,122,169,170,173,174,175,196, 204,205,206,229,232,233,236,238,239,251, 253,254,255,256,257,262,274,275,279,284, 295,296,298,02,305,308,309,310,311,312, 313
174	DIMETHYL-METHYLENE-BICYCLO-HEPTANE	126,244,247,290,297,300
175	1,2-DIETHYLBENZENE	252,259,300
176	(1-METHYLPROPYL)-BENZENE	252,300
177	ACETIC-ACID-ETHYL-ESTER	296
178	1,3-DIETHYLBENZENE	252,256,278,300
179	CYCLOPENTENE	256,278,300
180	HEPTANE	126,144,247,252,256,259,263,276,278,290, 291,300
182	CIS-DICHLOROETHENE	175,206,229,239,279
183	TRANS-DICHLOROETHENE	170,284
184	CYCLOPENTANE	252,256,259,278,285,300
185	CYCLOHEPTANE	252
186	1,2-PROPADIENE	300
187	CARBON OXIDE SULFIDE	139,220,248
188	2,2,3-TRIMETHYLBUTANE	300
189	1,2,3,4-TETRAMETHYLBENZENE	252
190	2,4,5-TRIMETHYLPHENOL	291
191	2-METHYL-2-BUTENE	252,259,300
192	1,2,3,5-TETRAMETHYLBENZENE	252
193	2,4,6-TRIMETHYLPHENOL	291
194	PENTYLBENZENE	252
195	2,2,4-TRIMETHYLPENTANE	126,256,259,276,300
197	DECAMETHYLCYCLOPENTA-SILOXANE	262
199	1,3-DICHLOROBENZENE	174,175,206,229,233,236,239,251,302,308, 309,310,311
200	HEXADECANE	262,291,299
201	2-METHYLTHIOPHENE	291
202	OCTAMETHYLCYCLOTETRASIL-OXANE	262

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
204	3,3-DIMETHYLPENTANE	252,259
205	3-METHYL-1-BUTENE	127,144,191,195,247,252,300
206	2-METHYL-1-BUTENE	126,252,259
207	2,2,3-TRIMETHYLPENTANE	278,300
208	2,3-DIMETHYLPENTANE	126,252,256,259,278,300
209	2,3,4-TRIMETHYLPENTANE	252,256,278,300
210	2,6-DIMETHYLPHENOL	291
211	1,2,3-TRIMETHYLBENZENE	127,252,256,259,278,300
212	2,3-DIMETHYLPYRIDINE	291
213	2,3-DIMETHYLHEXANE	256,278,300
214	3-CHLOROBENZALDEHYDE	169
215	3-METHYLHEXANE	126,247,252,256,259,263,276,278,283,300
216	2,4-DIMETHYLHEXANE	252,256,276,278,300
217	3-METHYLHEPTANE	252,276
218	(Z)-2-BUTENE	108,126,252,256,259,276,278,285,300
219	2-METHYLHEXANE	247,252,256,259,263,276,278,300
220	2,5-DIMETHYLHEXANE	252,300
221	2-METHYLHEPTANE	252,256,276,278,300
222	1-HEXENE	126,256,259,278
223	OCTADECANE	144
224	DIBROMODICHLOROMETHANE	174
226	1-ETHYL-2-METHYLBENZENE	126,252,256,259,276,278,300
227	(E)-3-METHYL-2-PENTENE	252
229	3-METHYLTHIOPHENE	291
230	3-ETHYLHEXANE	256,278
231	1-ETHYL-3-METHYLBENZENE	126,252,256,278,300
232	1-ETHYL-4-METHYLBENZENE	144,173,206,229,252,253,256,258,259,276, 278,279,300
233	(E)-2-BUTENE	126,252,256,259,276,278,285,300
235	2-METHYL-2-PENTENE	252,300
236	(Z)-2-PENTENE	108,126,252,256,259,278,300
237	1-CHLORO-2-METHOXYETHANE	194
238	TRIDECANE	262,291,299
239	TETRADECANE	262,291,299
240	PENTADECANE	262,291,299
241	HEPTADECANE	262,291
242	TETRACHLOROETHANE	175,206,229,236,239,253,279,296,311
244	(E)-2-PENTENE	126,252,256,259,278,291,300
245	(E)-4-METHYL-2-PENTENE	252
246	(Z)-4-METHYL-2-PENTENE	252,256,278,300
247	1-METHYLCYCLOPENTENE	300
248	2-METHYL-1-PENTENE	300
249	2-METHYLNONANE	263

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
251	1-ETHYL-DIMETHYLBENZENE	252
252	4-ETHYL-DIMETHYLBENZENE	252
253	3-ETHYL-DIMETHYL-PENTANE	263
254	HEXYLBENZENE	252
255	UNDECANE	10,39,144,188,251,262,291,299,300,311
258	METHYLBENZALDEHYDE	188,239
260	ETHYLCYCLOPENTANE	276,300
261	ETHYLCYCLOHEXANE	252,256,278,300
262	TRANS-1,3-DIMETHYL-CYCLOPENTANE	259
263	ETHYLTRIMETHYLPLUMBANE	184
264	DIETHYLDIMETHYLPLUMBANE	184
265	TRIETHYLMETHYLPLUMBANE	184
267	(3-METHYLBUTYL)-BENZENE	252
268	2,4-DIMETHYLHEPTANE	252
269	2,5-DIMETHYLHEPTANE	252
270	3-METHYLOCTANE	252
271	4-METHYLOCTANE	252
272	PAN	105,106,108,205,206,222,229,234,235,250,253,279,286,303
273	CIS-DIMETHYL-CYCLOPENTANE	259
275	2,2,5-TRIMETHYLHEXANE	300
276	3-BROMO-1-CHLORO-1-PROPENE	172
277	(E)-2-HEXENE	256,278
278	4-METHYL-2-PENTENE	126
280	NITRO-1-OXOPROPYLPEROXIDE	205,206,229,253,279
281	(R)-1-METHYL-4-(1-METHYLETHENYL)-CYCLOHEXENE	126,244,290,299,300
282	(S)-1-METHYL-4-(1-METHYLETHENYL)-CYCLOHEXENE	290,297
283	(Z)-2-HEPTENE	252
284	(Z)-2-OCTENE	252
285	(Z)-3-HEXENE	259,278
286	(Z)-2-HEXENE	256,278,300
287	(Z)-1,3-DICHLORO-1-PROPENE	302
289	TRICHLOROBENZENE	169,174,175,206,229,239,262
290	(E)-3-HEXENE	126,259
291	TRIMETHYLBICYCLO-HEPTENE	244,252,290,297
292	(E)-2-HEPTENE	126,252
293	4-METHYLNONANE	252

Table V-4. Contributing References to Ambient Data Base by Chemical (contd.)

Chemical Number	Chemical Name	References Contributing to Ambient Data Base
294	TETRACHLOROBENZENE	227
295	BUTENE	127,144,191,195,237,278,279,285,300
296	CHLORONITROBENZENE	239
297	DICHLOROBENZENE	262
298	DICHLOROETHENE	256,296
300	BROMOPROPANE	172,174
301	DICHLORO-1-PROPENE	173,175
302	CHLOROBENZENEAMINE	169
303	DIMETHYLCYCLOHEXANE	300
304	DICHLORONITROBENZENE	239
305	DICHLORONAPHTHALENE	48
306	DIMETHYLCYCLOPENTANE	256,300
307	BROMOMETHYLBENZENE	170,284
310	DICHLOROMETHYLBENZENE	239
311	BENZENEDICARBOXALDEHYDE	188
315	BENZOYL-NITRO-PEROXIDE	240
316	BROMOCHLOROPROPANE	174
317	1,1-DIBROMO-2-CHLOROPROPANE	174
318	PENTACHLORO-1,3-BUTADIENE	296
319	DIBROMOCHLOROPROPANE	172,308,309,310,311
320	BROMOPENTACHLOROETHANE	296

Table V-5. Contributing References to Indoor Data Base by Chemical

Chemical Number	Chemical Name	Reference Contributing Data
3	CUMENE	299
5	FORMALDEHYDE	260, 263, 264, 265, 266, 267, 268, 269, 270, 280, 282, 292, 293, 294
7	CARBON TETRACHLORIDE	308, 309, 310, 311
13	ACETONE	283
14	CHLOROFORM	308, 309, 310, 311
16	BENZENE	263, 283, 308, 309, 310, 311
17	TRICHLOROETHANE	283, 308, 309, 310, 311
37	BROMOFORM	308, 309, 310, 311
38	BROMODICHLOROMETHANE	308, 309, 310, 311
41	1,1-DICHLOROETHENE	309, 309, 310, 311
54	DICHLOROTETRAFLUORO-ETHANE (F-114)	262
62	METHYL ETHYL KETONE	283
64	TRICHLOROETHENE	262, 263, 283, 308, 309, 310, 311
66	TETRACHLOROETHANE	311
69	A-PINENE	262, 311
75	METHYLNAPHTHALENE	299
77	DIMETHYLBENZENE	262, 283, 308, 309, 310, 311
80	DICHLOROBENZENE	308, 309, 310, 311
81	TRIMETHYLBENZENE	262
92	ETHYLBENZENE	262, 283, 299, 308, 309, 310, 311
93	ETHENYLBENZENE	262, 308, 309, 310, 311
96	BENZALDEHYDE	283, 299
97	PROPYLBENZENE	262
101	DIMETHYLBENZENE	262, 283, 299, 308, 309, 310, 311
104	DICHLOROBENZENE	308, 309, 310, 311
106	DIBROMOETHANE	311
114	1,2-DICHLOROETHANE	308, 309, 310, 311
118	TETRADECAMETHYLCYCLO-HEPTASILOXANE	262
123	1,3-DIMETHYLBENZENE	299
127	TRIMETHYLBENZENE	262, 299
132	METHYLCYCLOHEXANE	263, 283
133	TOLUENE	262, 263, 283, 299, 308, 309, 310, 311
135	CHLOROBENZENE	262, 308, 309, 310, 311
140	PENTANE	283
146	HEXANE	283
148	CYCLOHEXANE	263
152	OCTANE	262, 311
154	2-BUTOXYETHANOL	262
155	NONANE	262, 263, 299
156	DODECANE	262, 299, 311
167	1,4-(DIOXANE)	311

Table V-5. Contributing References to Indoor Data Base by Chemical

Chemical Number	Chemical Name	Reference Contributing Data
170	DECANE	262, 283, 299, 311
171	DIBROMOCHLOROMETHANE	308, 309, 310, 311
173	TETRACHLOROETHENE	262, 308, 309, 310, 311
180	HEPTANE	263
181	TRIMETHYL-PENTANEDIOL	262
196	DODECAMETHYLCYCLO-HEXASILOXANE	262
197	DECAMETHYLCYCLO-PENTASILOXANE	262
198	HEXAMETHYLCYCLOTRI-SILOXANE	262
199	1,3-DICHLOROBENZENE	308, 309, 310, 311
200	HEXADECANE	262, 299
202	OCTAMETHYLCYCLO-TETRASILOXANE	262
203	HEXADECAMETHYLCYCLO-OCTASILOXANE	262
215	3-METHYLHEXANE	263, 283
219	2-METHYLHEXANE	263
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APPENDIX A

OLD AND NEW CHEMICAL IDENTIFICATION AND CAS NUMBERS

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
1		00-00-1	7-METHYL-3-METHYLENE-1,6-OCTADIENE
2		00-00-2	DIPHENYL ETHER
3		00-00-3	CUMENE
4		00-00-4	BUTYNE
5	33	50-00-0	FORMALDEHYDE
6	45	55-18-5	N-ETHYL-N-NITROSOAETHENAMINE
7	7	56-23-5	TETRACHLOROMETHANE
8		59-89-2	4-NITROSOMORPHOLINE
9	230	62-53-3	BENZENEAMINE
10	44	62-75-9	N-METHYL-N-NITROSOMETHANAMINE
11		64-18-6	FORMIC ACID
12	126	64-67-5	DIETHYL ESTER SULFURIC ACID
13	328	67-64-1	2-PROPANONE
14	6	67-66-3	TRICHLOROMETHANE
15	13	67-72-1	HEXACHLOROETHANE
16	1	71-43-2	BENZENE
17	10	71-55-6	1,1,1-TRICHLOROETHANE
18	301	74-82-8	METHANE
19	3	74-83-9	BROMOMETHANE
20	302	74-84-0	ETHANE
21	303	74-85-1	ETHENE
22	304	74-86-2	ETHYNE
23	2	74-87-3	CHLOROMETHANE
24	4	74-88-4	IODOMETHANE
25	201	74-95-3	DIBROMOMETHANE
26		74-97-5	BROMOCHLOROMETHANE
27	305	74-98-6	PROPANE
28		74-99-7	1-PROPYNE
29	113	75-00-3	CHLOROETHANE
30	15	75-01-4	CHLOROETHENE
31		75-05-8	ACETONITRILE
32	34	75-07-0	ACETALDEHYDE
33	5	75-09-2	DICHLOROMETHANE
34	129	75-15-0	CARBON DISULFIDE
35	337	75-18-3	THIOBISMETHANE
36	31	75-21-8	ETHYLENEOXIDE
37	205	75-25-2	TRIBROMOMETHANE
38	202	75-27-4	BROMODICHLOROMETHANE
39	307	75-28-5	2-METHYLPROPANE
40	114	75-34-3	1,1-DICHLOROETHANE
41	16	75-35-4	1,1-DICHLOROETHENE
42	35	75-44-5	CARBONIC DICHLORIDE
43	112	75-45-6	CHLORODIFLUOROMETHANE
44	32	75-56-9	METHYLOXIRANE
45	325	75-69-4	TRICHLOROFLUOROMETHANE
46	324	75-71-8	DICHLORODIFLUOROMETHANE
47	323	75-73-0	TETRAFLUOROMETHANE
48	130	75-74-1	TETRAMETHYLPLUMBANE
49		75-83-2	2,2-DIMETHYLBUTANE

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
50		75-93-4	MONOMETHYLESTER SULFURIC ACID
51	330	75-97-8	3,3-DIMETHYL-2-BUTANONE
52	207	76-01-7	PENTACHLOROETHANE
53	326	76-13-1	1,1,2-TRICHLORO-1,2,2,-TRIFLUOROETHANE
54	327	76-14-2	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE
55	30	77-47-4	1,2,3,4,5,5-HEXACHLOROCYCLOPENTADIENE
56	127	77-78-1	DIMETHYL SULFATE
57	131	78-00-2	TETRAETHYLPLUMBANE
58	117	78-75-1	1,2-DIBROMOPROPANE
59	310	78-78-4	2-METHYLBUTANE
60		78-79-5	2-METHYL-1,3-BUTADIENE
61	14	78-87-5	1,2-DICHLOROPROPANE
62	329	78-93-3	2-BUTANONE
63	11	79-00-5	1,1,2-TRICHLOROETHANE
64	18	79-01-6	TRICHLOROETHENE
65		79-29-8	2,3-DIMETHYLBUTANE
66	12	79-34-5	1,1,2,2-TETRACHLOROETHANE
67	46	79-46-9	2-NITROPROPANE
68		79-92-5	2,2-DIMETHYL-3-METHYLENE-BICYCLO[2,2,1]-HEPTANE
69	110	80-56-8	2,6,6-TRIMETHYL-BICYCLO[3.1.1]-HEPT-2-ENE
70		87-61-6	1,2,3-TRICHLOROBENZENE
71	22	87-68-3	1,1,2,3,4,4-HEXACHLORO-1,3-BUTADIENE
72	322	90-12-0	1-METHYLNAPHTHALENE
73	321	91-20-3	NAPHTHALENE
74		91-22-5	QUINOLINE
75		91-57-6	2-METHYLNAPHTHALENE
76	332	93-55-0	1-PHENYL-1-PROPANONE
77	102	95-47-6	1,2-DIMETHYLBENZENE
78	36	95-48-7	2-METHYL PHENOL
79		95-49-8	1-CHLORO-2-METHYLBENZENE
80	24	95-50-1	1,2-DICHLOROBENZENE
81	319	95-63-6	1,2,4-TRIMETHYLBENZENE
82		95-93-2	1,2,4,5-TETRAMETHYLBENZENE
83	212	96-12-8	1,2-DIBROMO-3-CHLOROPROPANE
84	314	96-14-0	3-METHYLPENTANE
85		96-22-0	3-PENTANONE
86		96-37-7	METHYLCYCLOPENTANE
87		98-82-8	(1-METHYLETHYL)-BENZENE
88		98-83-9	1-(METHYLETHENYL)-BENZENE
89	331	98-86-2	1-PHENYLETHANONE
90	43	98-95-3	NITROBENZENE
91		99-87-6	1-METHYL-4-(1-METHYLETHYL)-BENZENE
92	317	100-41-4	ETHYLBENZENE
93	104	100-42-5	ETHENYLBENZENE
94	29	100-44-7	(CHLOROMETHYL)-BENZENE
95	231	100-47-0	BENZONITRILE
96	119	100-52-7	BENZALDEHYDE
97		103-65-1	PROPYLBENZENE
98		104-51-8	BUTYLBENZENE

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
99		105-05-5	1,4-DIETHYLBENZENE
100		105-67-9	2,4-DIMETHYLPHENOL
101	103	106-42-3	1,4-DIMETHYLBENZENE
102		106-43-4	1-CHLORO-4-METHYLBENZENE
103	37	106-44-5	4-METHYLPHENOL
104	26	106-46-7	1,4-DICHLOROBENZENE
105	227	106-89-8	(CHLOROMETHYL)OXIRANE
106	9	106-93-4	1,2-DIBROMOETHANE
107	234	106-95-6	3-BROMO-1-PROPENE
108	308	106-97-8	BUTANE
109		106-98-9	1-BUTENE
110	105	106-99-0	1,3-BUTADIENE
111	39	107-02-8	2-PROPENAL
112	206	107-04-0	1-BROMO-2-CHLOROETHANE
113	20	107-05-1	3-CHLORO-1-PROPENE
114	8	107-06-2	1,2-DICHLOROETHANE
115		107-10-1	4-METHYL-2-PENTANONE
116		107-12-0	PROPANENITRILE
117	42	107-13-1	2-PROPENENITRILE
118		107-50-6	TETRADECAMETHYLCYCLOHEPTASILOXANE
119	313	107-83-5	2-METHYLPENTANE
120		107-87-9	2-PENTANONE
121	316	108-08-7	2,4-DIMETHYLPENTANE
122	228	108-31-6	2,5-FURANDIONE
123		108-38-3	1,3-DIMETHYLBENZENE
124	38	108-39-4	3-METHYLPHENOL
125		108-47-4	2,4-DIMETHYLPYRIDINE
126		108-48-5	2,6-DIMETHYLPYRIDINE
127	318	108-67-8	1,3,5-TRIMETHYLBENZENE
128		108-68-9	3,5-DIMETHYLPHENOL
129		108-70-3	1,3,5-TRICHLOROBENZENE
130		108-75-8	2,4,6-TRIMETHYLPYRIDINE
131	216	108-86-1	BROMOBENZENE
132		108-87-2	METHYLCYCLOHEXANE
133	101	108-88-3	METHYLBENZENE
134		108-89-4	4-METHYLPYRIDINE
135	23	108-90-7	CHLOROBENZENE
136		108-94-1	CYCLOHEXANONE
137	122	108-95-2	PHENOL
138		108-99-6	3-METHYLPYRIDINE
139		109-06-8	2-METHYLPYRIDINE
140	311	109-66-0	PENTANE
141		109-67-1	1-PENTENE
142	210	109-70-6	1-BROMO-3-CHLOROPROPANE
143		109-97-7	1H-PYRROLE
144		109-99-9	TETRAHYDROFURAN
145		110-02-1	THIOPHENE
146	315	110-54-3	HEXANE
147	116	110-56-5	1,4-DICHLOROBUTANE

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
148		110-82-7	CYCLOHEXANE
149		110-83-8	CYLCOHEXENE
150		110-86-1	PYRIDINE
151	41	111-44-4	1,1'-OXYBIS(2-CHLOROETHANE)
152	334	111-65-9	OCTANE
153		111-66-0	1-OCTENE
154		111-76-2	2-BUTOXYETHANOL
155	335	111-84-2	NONANE
156	106	112-40-3	DODECANE
157	306	115-07-1	PROPENE
158		115-11-7	2-METHYL-1-PENTENE
159		115-11-7	2-METHYL-1-PROPENE
160		119-61-9	DIPHENYLMETHANONE
161		119-65-3	ISOQUINOLINE
162		120-82-1	1,2,4-TRICHLOROBENZENE
163	111	123-01-3	DODECYLBENZENE
164		123-38-6	PROPANAL
165		123-72-8	BUTANAL
166		123-86-4	BUTYL ACETATE
167	229	123-91-1	1,4-(DIOXANE)
168		124-11-8	1-NONENE
169		124-13-0	OCTANAL
170	107	124-18-5	DECANE
171	203	124-48-1	DIBROMOCHLOROMETHANE
172	21	126-99-8	2-CHLORO-1,3-BUTADIENE
173	19	127-18-4	TETRACHLOROETHENE
174		127-91-3	6,6-DIMETHYL-2-METHYLENE-BICYCLO[3.1.1]-HE
175		135-01-3	1,2-DIETHYLBENZENE
176		135-98-8	(1-METHYLPROPYL)-BENZENE
177		141-78-6	ACETIC ACID ETHYL ESTER
178		141-93-5	1,3-DIETHYLBENZENE
179		142-29-0	CYCLOPENTENE
180	333	142-82-5	HEPTANE
181		144-19-4	2,2,4-TRIMETHYL-1,3-PENTANEDIOL
182	17	156-59-2	(Z)-1,2-DICHLOROETHENE
183	118	156-60-5	(E)-1,2-DICHLOROETHENE
184		287-92-3	CYCLOPENTANE
185		291-64-5	CYCLOHEPTANE
186		463-49-0	1,2-PROPADIENE
187		463-58-1	CARBON OXIDE SULFIDE
188		464-06-2	2,2,3-TRIMETHYLBUTANE
189		488-23-3	1,2,3,4-TETRAMETHYLBENZENE
190		496-78-6	2,4,5-TRIMETHYLPHENOL
191		513-35-9	2-METHYL-2-BUTENE
192		527-53-7	1,2,3,5-TETRAMETHYLBENZENE
193		527-60-6	2,4,6-TRIMETHYLPHENOL
194		538-68-1	PENTYLBENZENE
195		540-84-1	2,2,4-TRIMETHYLPENTANE
196		540-97-6	DODECAMETHYLCYCLOHEXASILOXANE

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
197		541-02-6	DECAMETHYLCYCLOPENTASILOXANE
198		541-05-9	HEXAMETHYLCYCLOTRISILOXANE
199	25	541-73-1	1,3-DICHLOROBENZENE
200		544-76-3	HEXADECANE
201		554-14-3	2-METHYLTHIOPHENE
202		556-67-2	OCTAMETHYLCYCLOTETRASILOXANE
203		556-68-3	HEXADECAMETHYLCYCLOOCTASILOXANE
204		562-49-2	3,3-DIMETHYLPENTANE
205	312	563-45-1	3-METHYL-1-BUTENE
206		563-46-2	2-METHYL-1-BUTENE
207		564-02-3	2,2,3-TRIMETHYLPENTANE
208		565-59-3	2,3-DIMETHYLPENTANE
209		565-75-3	2,3,4-TRIMETHYLPENTANE
210		576-26-1	2,6-DIMETHYLPHENOL
211	320	576-73-8	1,2,3-TRIMETHYLBENZENE
212		583-61-9	2,3-DIMETHYLPYRIDINE
213		584-94-1	2,3-DIMETHYLHEXANE
214	226	587-04-2	3-CHLOROBENZALDEHYDE
215		589-34-4	3-METHYLHEXANE
216		589-43-5	2,4-DIMETHYLHEXANE
217		589-81-1	3-METHYLHEPTANE
218		590-18-1	(Z)-2-BUTENE
219		591-76-4	2-METHYLHEXANE
220		592-13-2	2,5-DIMETHYLHEXANE
221		592-27-8	2-METHYLHEPTANE
222		592-41-6	1-HEXENE
223	109	593-45-3	OCTADECANE
224	204	594-18-3	DIBROMODICHLOROMETHANE
225	222	608-93-5	PENTACHLOROBENZENE
226		611-14-3	1-ETHYL-2-METHYLBENZENE
227		616-12-6	(E)-3-METHYL-2-PENTENE
228		616-43-3	3-METHYL-1H-PYRROLE
229		616-44-4	3-METHYLTHIOPHENE
230		619-99-8	3-ETHYLHEXANE
231		620-14-4	1-ETHYL-3-METHYLBENZENE
232	336	622-96-8	1-ETHYL-4-METHYLBENZENE
233		624-64-6	(E)-2-BUTENE
234		624-92-0	DIMETHYLDISULFIDE
235		625-27-4	2-METHYL-2-PENTENE
236		627-20-3	(Z)-2-PENTENE
237	232	627-42-9	1-CHLORO-2-METHOXYETHANE
238		629-50-5	TRIDECANE
239		629-59-4	TETRADECANE
240		629-62-9	PENTADECANE
241		629-78-7	HEPTADECANE
242	115	630-20-6	1,1,1,2-TETRACHLOROETHANE
243		636-41-9	2-METHYL-1H-PYRROLE
244		646-04-8	(E)-2-PENTENE
245		674-76-0	(E)-4-METHYL-2-PENTENE

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
246		691-38-3	(Z)-4-METHYL-2-PENTENE
247		693-89-0	1-METHYLCYCLOPENTENE
248		763-29-1	2-METHYL-1-PENTENE
249		871-83-0	2-METHYLNONANE
250		931-54-4	ISOCYANOBENZENE
251		933-98-2	1-ETHYL-2,3-DIMETHYLBENZENE
252		934-80-5	4-ETHYL-1,2-DIMETHYLBENZENE
253		1068-87-7	3-ETHYL-2,4-DIMETHYL PENTANE
254		1077-16-3	HEXYLBENZENE
255	108	1120-21-4	UNDECANE
256		1320-37-2	DICHLOROTETRAFLUOROETHANE
257		1333-41-1	METHYLPYRIDINE
258	120	1334-78-7	METHYLBENZALDEHYDE
259		1502-38-1	METHYLCYCLOOCTANE
260		1640-89-7	ETHYLCYCLOPENTANE
261		1678-91-7	ETHYLCYCLOHEXANE
262		1759-58-6	TRANS-1,3-DIMETHYL CYCLOPENTANE
263	132	1762-26-1	ETHYLTRIMETHYLPLUMBANE
264	133	1762-27-2	DIETHYLDIMETHYLPLUMBANE
265	134	1762-28-3	TRIETHYLMETHYLPLUMBANE
266		1795-27-3	1A,3A,5A-TRIMETHYLCYCLOHEXANE
267		2049-94-7	(3-METHYLBUTYL)-BENZENE
268		2213-23-2	2,4-DIMETHYLHEPTANE
269		2216-30-0	2,5-DIMETHYLHEPTANE
270		2216-33-3	3-METHYLOCTANE
271		2216-34-4	4-METHYLOCTANE
272	123	2278-22-0	ACETYL NITRO PEROXIDE
273		2532-58-3	CIS-1,3-DIMETHYL CYCLOPENTANE
274		2807-30-9	2-PROPOXY ETHANOL
275		3522-94-9	2,2,5-TRIMETHYLHEXANE
276	215	3737-00-6	3-BROMO-1-CHLORO-1-PROPENE
277		4050-45-7	(E)-2-HEXENE
278		4461-48-7	4-METHYL-2-PENTENE
279	40	4885-02-3	DICHLOROMETHOXYMETHANE
280	124	5796-89-4	NITRO-1-OXOPROPYLPEROXIDE
281		5989-27-5	(R)-1-METHYL-4-(1-METHYLETHENYL)-CYCLOHEXENE
282		5989-54-8	(S)-1-METHYL-4-(1-METHYLETHENYL)-CYCLOHEXENE
283		6443-92-1	(Z)-2-HEPTENE
284		7642-04-8	(Z)-2-OCTENE
285		7642-09-3	(Z)-3-HEXENE
286		7688-21-3	(Z)-2-HEXENE
287		10061-01-5	(Z)-1,3-DICHLORO-1-PROPENE
288		10061-02-6	(E)-1,3-DICHLORO-1-PROPENE
289	27	12002-48-1	TRICHLOROBENZENE
290		13269-52-8	(E)-3-HEXENE
291		13466-78-9	3,7,7-TRIMETHYLBICYCLO[4.1.0]HEPT-3-ENE
292		14686-13-6	(E)-2-HEPTENE
293		17301-94-9	4-METHYLNONANE
294	28	17700-09-3	TETRACHLOROBENZENE

New Chem ID	Old Chem ID	CAS Registry Number	CAS Name
295	309	25167-67-3	BUTENE
296	223	25167-93-5	CHLORONITROBENZENE
297		25321-22-6	DICHLOROBENZENE
298		25323-30-2	DICHLOROETHENE
299		25619-60-7	TETRAMETHYL BENZENE
300	208	26446-77-5	BROMOPROPANE
301	214	26952-23-8	DICHLORO-1-PROPENE
302	225	27134-26-5	CHLOROBENZENEAMINE
303		27195-67-1	DIMETHYLCYCLOHEXANE
304	224	27900-75-0	DICHLORONITROBENZENE
305	233	28699-88-9	DICHLORONAPHTHALENE
306		28729-52-4	DIMETHYLCYCLOPENTANE
307	217	28807-97-8	BROMOMETHYLBENZENE
308		29224-55-3	ETHYL DIMETHYL BENZENE
309	221	29733-70-8	TETRACHLOROMETHYLBENZENE
310	218	29797-40-8	DICHLOROMETHYLBENZENE
311	121	30025-33-3	BENZENEDICARBOXALDEHYDE
312		30498-63-6	TRIMETHYLCYCLOHEXANE
313	219	30583-33-6	TRICHLOROMETHYLBENZENE
314		30677-34-0	ETHYLMETHYLCYCLOHEXANE
315	125	32368-69-7	BENZOYL NITRO PEROXIDE
316	209	34652-54-5	BROMOCHLOROPROPANE
317	213	55162-35-1	1,1-DIBROMO-2-CHLOROPROPANE
318		55880-77-8	PENTACHLORO-1,3-BUTADIENE
319	211	67708-83-2	DIBROMOCHLOROPROPANE
320		79504-02-2	BROMOPENTACHLOROETHANE

APPENDIX B

VOC DATA ASSESSMENT/SURVEY FORM

Ambient VOC Data Base Update

Under an Environmental Protection Agency (EPA) contract, Nero and Associates, Inc. (NAI) is attempting to collect, evaluate and process all ambient and indoor data on potentially hazardous Volatile Organic Chemicals (VOC's) obtained in the United States since 1980. **We would like you to fill out the attached VOC Data Assessment/Survey form and/or send us copies of reports and data, preferrably on IBM PC readable disks or as appropriate.** The data collected will be incorporated into the data base on ambient VOC concentrations in urban, rural, source dominated, personal and indoor environments. The updated data base in dBASE III will be available for use on IBM compatible personal computers in the middle of 1987.

Many of you are familiar with the existing VOC data base, published in 1983, "Volatile Organic Chemicals in the Atmosphere: An Assessment of Available Data," EPA-600/3-83-027(a). This data base, containing data collected from 1970 to 1980, was created under a previous EPA contract in which 241 articles were evaluated. Of these, 67 yielded 17,700 records of information on 132 chemicals, each record representing all the reported measurements for one chemical at one site during one day. The data were also evaluated for quality. We have enclosed summary tables from this data base for your use, and to emphasize that the time spent responding to our assessment form will be rewarded with an improved, publically available data base. It is expected that the new data base will have even wider applications.

In addition to data extraction and quality assessment, the update will include an exploratory analysis of the data to attempt investigation of questions such as the following:

- What is the likely range and distribution of ambient concentrations for the various chemicals?
- Are there any detectable patterns or trends?
- Are there detectable chemical "hot spots," or are the ambient concentrations relatively consistent over wide areas?

As an expert in the field of trace species analysis, you are well aware of the sampling, analysis, and quality assurance details necessary to compile such a data base. The attached assessment form is designed to save you time and elicit **consistent responses.** Data in the form of PC readable disks,

reports, papers, or hand written documents should also be attached. If you provide PC readable disks, please specify the computer and format of the data. Also, we prefer the data to be submitted as daily averages but any averaging period is acceptable.

When multiple chemicals are measured at multiple sites, the forms can be duplicated. You may elect to send us the attachments in the form of reports alone if your time does not permit completion of the form. Of course, completing the form entirely, or even answering the questions not covered in your report, will improve the completeness and the usefulness of the database.

Your cooperation in submitting VOC data is greatly appreciated. The resulting data base will be available on diskettes from EPA or NAI upon completion of this project. Confidential information is optional for the attached questionnaire. Please remember, this data base cannot be compiled without your help. The extensiveness of the data is directly proportional to the number of scientists responding to this survey.

If you have new data that you are not willing to divulge, please let us know what information is likely to be available in the near future. Also, if you are aware of colleagues who are generating data which could be included in the data base, please let us know so that we may contact them.

Please do not hesitate to call Jitendra Shah of NAI at (503) 223-4150, or Larry Cupitt of EPA at (919) 541-2878, if you have questions or comments about this project.

Very truly yours,

NERO AND ASSOCIATES, INC.

Ann Britton for

Jitendra J. Shah, Ph.D.
Manager
Environmental Analysis Group

JJS/cs

VOC DATA ASSESSMENT/SURVEY FORM
OMB Clearance No. 2060-0012
Expiration Date May 30, 1989

Nero and Associates, Inc. (NAI)
520 S.W. Sixth Avenue, Suite 1250
Portland, Oregon 97204

If you have any questions, please call Jitu Shah (503)223-4150

Researcher's Name(s): _____

Institution: _____

Address: _____

City:_____ State:_____ Zip: _____

Telephone Number: _____

Study Sponsor: _____ Tel. No. ( ) _____

Chemical(s): _____

Site Longitude: _____

Latitude: _____

Site Address: _____

City: _____ State:_____ Zip:_____

Site Type:

A. Remote..... ☐ B. Rural..... ☐

C. Suburban..... ☐ D. Urban..... ☐

E. Source Dominated..... ☐ F. Indoor (Residential).. ☐

G. Personal (Indoor & Outdoor)... ☐ H. Indoor (Workplace).... ☐

Most Dominant Source at the Site (Specify): _____

If SAROAD site, Give Site No: _____

Measurement Units:

A. ppt..... ☐ B. ug/m^3..... ☐

C. ppbC..... ☐ D. Other (Specify)..... ☐

Sampling Method:

A. Direct..... ☐ B. Pressurized Canisters..... ☐

C. Absorbing Resin..... ☐ D. Absorbing Cartridge..... ☐

E. Bag Samples..... ☐ F. Cold Trap..... ☐

G. Bubbler..... ☐ H. Hi-Vol..... ☐

I. Other (specify):_____ ☐

Analysis Method:

A. GC-ECD..... ☐ B. GC-FID OR GC-FPD..... ☐

C. GC-EC/coul..... ☐ D. Chemiluminescence..... ☐

E. GC-TEA..... ☐ F. FTIR..... ☐

G. Tot. Hydrocarbon Analysis. ☐ H. GC-PID..... ☐

I. Bioassay..... ☐ J. GC/MS..... ☐

K. GC-MPD..... ☐ L. Wet Chemical..... ☐

M. MS/MS..... ☐ N. HPLC..... ☐

O. Other (specify):_____ ☐

Data Averaging Time:

A. Grab sample..... ☐ B. 1-hour..... ☐

C. 2-23 hours..... ☐ D. 24-hours..... ☐

E. 1 to 7 days _____..... ☐ F. Long term (> 7 days)

G. Other (specify) _____ ☐ specify:_____ ☐

Detection Limit of Analysis Method Used:

Precision:

Accuracy:

Type and Sources of Standards:

Frequency of calibration:

Quality control and assurance:

What was the objective of this sampling?

What other sampling was done simultaneously?

Weather conditions during sampling:

Future plans for similar sampling:

General Comments, e.g. address:

- -uncertainties in data
- -artifacts and interferences
- -problems encountered in sampling
- -the weakest part of the measurement process
- -opinions of acceptable absolute accuracies for VOC measurements in air
- -preferred averaging time (e.g. 24 hours, one week, one month)
- -guidelines for site selection
- -other potential uses of this data
- -problems encountered in using the database
- -suggestions for improving the data assessment/survey form
- -suggestions for improvement over the previous VOC database
- -others

Please attach PC readable disks and specify the format (dBASE III and IBM ASCII files are preferred but any format is better than us having to re-input the data) or highlight report or documentation in the form of data sheets or fill out this table.

Local Start-time & date	Local Stop-time & date	Concentration (units)	Time Between Sampling & Analysis	Comments

APPENDIX C

LIST OF ERRORS FOUND IN 1980 VOC DATA BASE

December 16, 1986

Larry Cupitt
U.S. Environmental Protection Agency
Office of AP&D - ESPL
Mail Drop 84
Research Triangle Park, NC 27711

Dear Larry:

We have completed the QA check for 13 of the 15 references suggested by Hanwant Singh. These 13 articles yielded about 1,000 data records; we checked about 175 of these to ascertain the types of errors which were occurring. We wanted to summarize these for you and solicit your input regarding whether it is reasonable to expend the considerable amount of time to actually check all the information for each data record.

I have enclosed a list of specific problems for each reference. To summarize, the actual numbers were rarely wrong, problems occurred instead with improperly combining sites, failing to extract all useful data and incorrectly reporting standard deviations and minimum detection limits. We did not attempt to recreate the quality codes for checking. We also did not check the longitude and latitude if they were not provided in the reference. These activities would require much more time than is allotted for this task. Please review the enclosed list and let us know where you would like us to go next.

Additionally, if they are easy to obtain, could you please send us references 20 and 229? We have copies but they are on microfiche and we hate to waste project time sitting in front of a microfiche machine making copies!

Sincerely,

NERO AND ASSOCIATES, INC.

Jitendra J. Shah, Ph.D.
Manager
Environmental Analysis Program

JJS/gb

Reference 6

- 216 data records on formaldehyde (hourly averages) not included in the data base.
- no site address reported even though given in the reference
- analytical method reported as wet chemical, reference indicates spectrophotometry (no category for this)

Reference 42

- no data was extracted from this reference (field studies were performed, but this data is not provided in the reference)

Reference 52

- no data was extracted from this reference; however, 300 hourly averages for tetrachloroethylene were given in the reference

Reference 73

- sites were combined in the averages included in the data base (e.g. 10 sites spread out over 20 city blocks were combined)
- only data from absorbing cartridges was reported although some data from filter samples were given (8 data records omitted)
- absorbing cartridges were "charcoal," but were reported as "absorbing cartridge (Tenax)" in the data base
- two concentration errors in 11 data records
- no detection limit reported although reference provides a minimum

Reference 84

- no data extracted from this reference (measurements not made in the U.S.)

Reference 117

- same as reference 84

Reference 122

- used analytical method standard deviation for sites with samples on more than one day
- minimum concentration several times reported as 1 (the detection limit) when it should have been 0 (below the detection limit)
- data type incorrectly reported several times (e.g. reported "more than seven days" when the period was really less than seven days)

Reference 174

- used analytical method standard deviation for sites with samples on more than one day

- minimum concentration several times reported as 1 (the detection limit) when it should have been 0 (below the detection limit)
- data type incorrectly reported several times (e.g. reported "more than seven days" when the period was really less than seven days)

Reference 174

- measurements from two cities not included in data base
- (some indoor measurements which can be included in the new data base)

Reference 196

- sites combined in averaging

Reference 209

- no data was extracted from this reference although there are 50 useful data records

Reference 227

- ground-based and air-borne samples were combined in averaging
- the distinction between detection limits and trace quantities not clearly made
- many sites combined

APPENDIX D

USER'S GUIDE TO
VOC DATA BASE UTILITY PROGRAM

VOC DATA BASE UTILITY PROGRAM

1.0 General Description/Scope

The VOC Utility Program is a menu-driven data entry program written in the dBase III+ programming language. The program provides the user with a simple method of entering new data into one of five VOC data bases and/or extracting pertinent data based on a set of user identifiable filters.

It is assumed that the user has a working knowledge of MS-DOS and dBase III+. Therefore, no attempt will be made in this procedure to describe in detail MS-DOS or dBase III+ commands.

2.0 Requirements

- dBase III+ Plus (Version 1.0) or greater

3.0 Getting Started

3.1 Make sure that the VOC utility program has a path to the VOC data base files or is in the same directory.

3.2 Invoke dBase III+ and at the dot prompt type:

```
.DO VOC (ct)
```

The program will present an opening page and proceed to verify that all necessary files are present. If any files are detected missing then the user will be presented a list of the missing files. If this occurs, verify that all files are in the default directory. A full list of the program files can be found in the data base file VOC_FILE.DBF.

3.3 Once the file verification is complete, the MAIN MENU will be displayed. The user can then select:

(1) enter new data
(2) extract old data
(3) set certain program operating parameters, or
(4) quit.

Any menu item can be selected by simply pressing the associated number on the keyboard. Any keyboard entry other than a menu selection will be ignored.

4.0 Program Description

4.1 MAIN MENU

Four options are provided at the MAIN MENU.

(1) Enter new Data
(2) Extract Data

(3) Utility
(4) Exit Program

4.4.1 (1) Enter new Data

After selecting number "1" at the MAIN MENU the user will presented with the new data menu. This menu has six (6) possible selections all with the sole purpose of entering new data into the individual VOC data bases.

(1) Enter new SITE data

Use this selection to enter new data into the VOC_SITE.DBF data base.

(2) Enter new METHOD data

Use this selection to enter new data into the VOC_MTHD.DBF data base.

(3) Enter new CONCENTRATION data

Use this selection to enter new data into the VOC_AMBI.DBF and VOC_INDO.DBF data bases.

(4) Enter new BIBLIOGRAPHY data

Use this selection to enter new data into the VOC_REFS.DBF data base.

(5) Enter new CHEMICAL data

Use this selection to enter new data into the VOC_CHEM.DBF data base.

(6) Return to MAIN MENU

Use this selection to return to the MAIN MENU.

4.4.2 (2) Extract Data (User Data base)

The User Data base is comprised of pre-selected fields from the VOC_AMBI, VOC_INDO, VOC_CHEM, VOC_MTHD, and VOC_SITE data bases. The data that will be stored in these fields are determined through a set of filters that the program sets up according to how the user answers questions about the data he wishes to extract.

The user will be presented with a brief explanation of the User Data base and a choice to continue or return to the MAIN MENU.

If the user wishes to continue, then the program will ask for a name to call the User Data base. Another drive can be selected by placing the drive letter and a colon before the name. Path names other than another drive are not supported.

example - A:MYDATA

NOTE: DO NOT include the data base (.DBF) extension after the name as the program does this automatically for you.

Once a name has been entered, the program will verify that a duplicate name does not exist in the same directory. If a duplicate file does exist then an option is presented of writing over the existing file or choosing a new name.

Next the program will ask a series of questions regarding what type of filters to set up for the User Data base. The options include:

- Whether to use the Ambient or Indoor data bases.
- A particular State and City, all Cities in a State, or all States.
- A particular Date range (ex. 1/15/86 to 1/15/87)
- A particular Chemical or all Chemicals.

Once all questions have been answered, the filters selected will be presented for verification. Type "Y" to continue or "N" to start over and revise filters, data base name, or quit.

If "Y" is selected then the number of records matching the filters will be counted and the default drive (or the drive selected along with the name) will be checked for enough space to hold the resultant data base.

If there is not enough drive space, then the program will notify you of this and abort. If this is the case, either select another drive or a smaller range of filters. For example, if at first a two year period was selected, then select two one year periods instead and create two User Data bases. Do not forget to remove the first one year period from the drive before creating the second!

If the available drive space is large enough, then a data base (.DBF) file will be created with a structure as follows:

Field	Field Name	Type	Width	Dec
1	REF_ID	Character	4	
2	SITE_ID	Character	3	
3	CHEM_ID	Character	3	
4	CONC_PPB	Numeric	10	3
5	RSD	Numeric	3	
6	NUM_SMPLS	Numeric	3	
7	MIN_CONC	Numeric	10	3
8	MAX_CONC	Numeric	10	3
9	NUMLESSMQL	Numeric	3	
10	START_DATE	Date	8	
11	START_TIME	Character	4	
12	STOP_DATE	Date	8	
13	STOP_TIME	Character	4	
14	DELAY_HRS	Numeric	4	
15	RANKING	Character	4	
16	RATING	Character	1	
17	SAMP_DUR	Character	4	
18	COMMENTS	Character	16	
19	SAMP_MTHD	Character	8	
20	ANAL_MTHD	Character	8	
21	MQL	Numeric	10	3
22	SITE_TYPE	Character	2	
23	LATITUDE	Numeric	6	3
24	LONGITUDE	Numeric	7	3
25	SITE_ADDR	Character	24	
26	CITY	Character	16	
27	STATE	Character	2	
28	SAROAD_NO	Character	12	
29	PRININVEST	Character	20	
30	CAS_NAME	Character	44	
** Total **			262	

4.4.3 (3) Utility Menu

Selection "3" at the MAIN MENU presents five options:

(1) Concentration Data base Statistics

This selection will display a screen full of useful data including:

- the version MS-DOS being used
- the version dBase III+ being used
- the total size of VOC_AMBI.DBF, VOC_INDO.DBF
- the last time the VOC_AMBI.DBF, VOC_INDO.DBF file was edited
- space left on the default drive

(2) Reindex ALL Data bases

This selection will create from scratch all of the necessary index (.NDX) files needed for the Utility

program to perform properly. Normally the index files are updated automatically when data is changed or added from within the Utility program. However, manual editing or modification of data-base data done outside the program can corrupt the index files. Remember that because of the nature of an index file, if it becomes corrupted, it can create much confusion and loss of data integrity.

Note that with large data bases reindexing could take the better part of an hour or more.

(3) Turn Beep ON/OFF

This selection will turn off the beep when data windows are filled and the system prompts for an enter key. It will not turn off the beep during menu selections

(4) Display Opening Screen

This selection will display the opening page and rerun the file check utility that is done at the beginning of the program. After the file check is complete the program returns to the Utility menu.

(5) Return to MAIN MENU

Use this selection to return to the MAIN MENU.

5.0 Problems/Solutions

1. Problem: Missing record numbers or confusing match up of records.

   Solution: Could be that the data base index (.NDX) files are not up to date. Use the Utility Menu option to update the index files. Note that with a large data base, reindexing could take an hour or more to complete.

   Index files are updated automatically when the Enter New Data option is selected from the MAIN MENU. However, if manual edits are performed on the data bases, the index files may not be updated.

2. Problem: "Too many open files"

   Solution: Check the CONFIG.SYS file in the root directory of the default drive. Make sure that the following commands are present:

   ```
   FILES=15
   BUFFERS=20
   ```

   If these commands are not present, or if there is not a CONFIG.SYS file in the root directory, then create or edit the file to include

the above two commands and reboot the system. dBase III+ needs to have this configuration in order to function properly.

3. Problem: "Cannot find file"

   Solution: Rerun the opening page selection from the Utility Menu. This will verify that all necessary files can be accessed.

6.0 Programming Notes

1. A listing of all VOC Utility Program files, cross-references, and symbol tables are contained in the file VOC_XREF.DOC.

2. All required index files can be created from scratch by running the program file VOC_INDX.PRG by itself or from the VOC Utility Program by selecting "4" in the Utility Menu. Note that because of the size of the VOC data bases, this may take the better part of an hour to run.

3. All index files are maintained automatically when appending data inside of the VOC Utility Program.

4. A list of all required files can be found in the VOC_FILE.DBF data base.

5. The User Data base skeleton structure is contained in the VOC_USER.SHL data base.

6. Skeleton structures for the remaining data bases are found in their corresponding VOC_XXXX.SHL data bases.

7. Many of the VOC Utility Program files are too large to edit with the dBase III+ editor. Either use an ASCII editor outside of the dBase III+ shell or create a CONFIG.DB file in the default directory and include in it the following command:

```
TEDIT=youreditor        ; where "youreditor" is the command
                          to invoke a word processor capable
                          of inputting and outputting ASCII
                          only files.
```

   Now "youreditor" will be invoked when using the MODIFY COMMAND filename inside of the dBase III+ shell.

   WARNING: Modifying the VOC Utility Program is done at your own risk. Nero and Associates, Inc. (NAI), EPA or authors of this report will not be held responsible for any data loss or damage resulting from use and modification of the VOC Utility Program.